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OF

THERAPEUTICS AND PUBLIC HEALTH.

EDITED BY

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THE PRACTITIONER.

JANUARY, 1878.

Original Communications.

GLYCERINE IN THE TREATMENT OF INTERNAL HÆMORRHOIDS.

BY DAVID YOUNG, M.D., FLORENCE.

Two years ago my attention was directed to the use of glycerine in the treatment of hæmorrhoids in the following manner. An elderly lady suffering from diabetes mellitus came under my care. To allay her great thirst I ordered a drink consisting of glycerine and water acidulated with lemon-juice. She drank freely of this for several weeks, and during the same period used glycerine in every case as a substitute for sugar. During one of my visits she asked if the glycerine was intended to act in any way upon the bowels. I replied in the negative, when she told me that since she had taken it she had been almost entirely free from bleeding piles, from which she had suffered for several years previously, and more or less continuously. At this time I was attending a young lady with advanced tubercular disease of both lungs, and whose *ill-health* was greatly increased by the discomfort and pain caused by a large internal dorsal pile, which came down constantly at stool and upon the slightest exertion, and occasionally, at varying intervals weakened her by bleeding profusely. A radical cure she would not hear of, and indeed I would have hesitated in

attempting it upon such a debilitated subject. Everything else had been tried, the bowels were regulated as far as possible by diet, frequent ablution with cold water was carried out, and various astringent applications were used, but all to no purpose. I resolved to try the glycerine, and ordered two teaspoonfuls to be taken in a little water morning and evening. The result has been most satisfactory. She has now taken it for more than a year, during which time she has not had the slightest trouble from the pile.

I am at present trying it in several other cases, but only three of them have been sufficiently long under treatment to warrant anything being said about them.

The first case is that of a weak, nervous man, aged fifty-four, who has been a *bon vivant*, and is now a confirmed dyspeptic, and has suffered very much for several years from bleeding piles. As he would not consent to have the hæmorrhoids removed, I ordered him three drachms of glycerine in a wine-glassful of water morning and evening. Six months have now elapsed, and he has had no trouble whatever from the hæmorrhoids, and in other respects he is in better health than he has been for several years.

The second case is a young married lady. She has been tormented with bleeding piles for more than two years. On examination, I found three large internal piles, and several flabby tabs of skin—the remains of external piles of bygone days. I advised her to have the internal ones removed by the thermo-cautery, to which she agreed, but her husband would not give his consent till every other means had been tried. She is now taking two drachms of Sarg's glycerine night and morning, and so far with a fairly good result. For more than two years she had never been free from attacks of pain and bleeding for more than a month at a time, and frequently not so long. Now she has passed three months with the minimum of discomfort and no bleeding whatever.

The last case I will mention is a young gentleman who has lived many years in Italy, and has suffered more or less from piles for two or three years. Sometimes the attacks have been very severe, compelling him to remain in bed for several days. Frequently he had complete prolapsus with the descent of the

piles, and could never walk the shortest distance without feeling considerable discomfort in the rectum. In addition to the glycerine, he used at bedtime a suppository containing Persulphate of Iron, half a grain. Since he has employed these means, he writes that he is certainly better.

The foregoing cases seem to show that we may be able to add glycerine to our list of palliatives for this troublesome malady. There are many patients who will not submit to surgical interference, and others—as for example consumptives in advanced stages of their disease—to whom one would scarcely recommend it, so that we are glad to welcome any means which would alleviate such a distressing condition. Not the least recommendation of this plan is, that it is both easy and pleasant, and probably also, especially in the case of phthisical patients, beneficial in some other respects. None of the patients to whom I have given it have experienced any difficulty in taking it, and when the sweet taste is an objection I usually order a little lemon-juice to be added to each dose.

A CASE OF ASCITES, AND ITS SUCCESSFUL TREATMENT.

BY JOHN KENT SPENDER, M.D. LOND., BATH.

In a recent number of the *Practitioner* a case of dropsy was related by Dr. Fothergill; and I hope that the following case has sufficient points of interest to justify its publication.

Personal and Clinical History.—E. H., a well-nourished, muscular man, was born on September 24, 1822. In the early part of his life he always enjoyed good health. He became an officer's servant in the 21st Fusiliers, first battalion, and went to India in 1841. He was in Bengal and Madras for seven years, and returned to England in 1848. He remained at home until 1854. In August of that year he went to the Crimea, and was "right through the Crimean war," being present in four engagements. During this period he suffered slightly from intermittent fever; but he did not hear from any medical authority that his liver or spleen was affected. Returning to Malta in September, 1856, he lived there for two or three years. From Malta he sailed direct for Barbadoes, and was quartered there until the end of his twenty-one years' service. He came home in 1861, and was engaged as a servant to the Bath and County Club at the close of that year.

From this date to the close of 1875, the health of E. H. was almost uniformly good, and his habits were most regular and temperate. It was on January 5, 1876, that he was "taken ill," and could not perform his duties. He says that he felt as if "a cold had come over him:" his legs were tired, and his feet ached. Medical advice was immediately obtained. Gradually, however, he became worse, the belly began to swell, and in quick succession the thighs, the legs, and the feet. The bowels were consti-

pated, the urine scanty, and the breathing uneasy and short. On Saturday, February 26, a highly-qualified medical friend told the wife of E. H. that he "could not live more than three days," and it was to verify this gloomy prognosis that my opinion was sought on the same afternoon. The case was henceforward under my exclusive care, and certainly seemed very unpromising. The abdomen was greatly distended with fluid, and measured 38¾ inches in circumference at the level of the umbilicus. There had been no action of the bowels for two or three days. A small quantity of dark turbid urine was shown to me. There was no appetite for food, and scarcely any had been taken for some weeks. The thighs, legs, and feet were extremely œdematous. The dyspnœa was severe and increasing, and hardly any sleep was obtained night or day.

But the dark picture had a bright side. Careful auscultation of the heart discovered no murmur, and not even an irregularity of action. The lungs seemed healthy in every part, except that some basic *râles* could be heard. There was no evidence of any disease of the large blood-vessels. The intellect was clear, nor were there any signs of aberration in sensory or motor functions. Literally it seemed as if the upper half of the body were entirely free from disease, and as if the organs which it contained did their duty in almost physiological perfection.

The immediately pressing indication was to cause a free action of the bowels. Two powders were ordered, containing jalap, gamboge, and elaterium; they were taken at an interval of twelve hours, and caused several large watery evacuations. A mixture containing acetate of potash and chloric ether was taken at the same time. The patient was kept in bed in a warm room, and allowed an abundance of milk and weak tea (nothing else) as his diet.

On Monday, the 28th, there was a slight improvement. The relief of the bowels had lessened the dyspnœa, and more urine had passed. The abdomen measured half an inch less than on Saturday. The mixture and powders were repeated; a powder to be taken every night.

On March 3rd my patient was decidedly better. The effect of the medicines was most beneficial. Fluid food was readily taken, and seemed to be digested. To-day I carefully examined

the urine: it contained albumen to the extent of about $\frac{1}{10}$th, and the sp. gr. was 1024. There was no sugar, and the reaction was only slightly acid. Examined under the microscope, the urine presented blood-globules, and what looked like small "waxy casts."

The improvement was sustained on the 9th inst., and I was able to pronounce with certainty that there would be no rapidly fatal issue. The albuminuria was diminishing. I prescribed a combination of tartrate of soda and tartrate of iron: the former in such doses as to secure a continuously laxative action of the bowels. One of the old powders was now given on every third morning.

Six days afterwards, the abdomen measured thirty-seven inches in circumference, and the swelling in the lower limbs was clearly going down. Broth was allowed in addition to the milk. As the powders were nauseous and caused sickness, the following pills were ordered:—

Ext: Elaterii gr. ij
P. Gambogiæ gr. vj
P. Capsici gr. vj
Ext. Gent. q. s. M. ft. pil. vj primo mane p. r. n.

On the 21st inst., it was evident that the iron mixture did not agree, and the old acetate of potash mixture was substituted for it. Some solid food was permitted.

On March 27th, 15 minims of tincture of digitalis were added to each dose of the diuretic mixture; and on April 8th I added a little decoction of broom. The pills were continued at regular intervals. During these few weeks the size of the legs and thighs steadily went down, and the health so far improved that E. H. was out of bed for some hours every day; but the ascites was very slowly reduced. Consequently on the 11th of April I drew off by tapping twenty-two pints of thin straw-coloured fluid. He bore the operation well, and was much relieved. Immediately afterwards the abdomen was bandaged with moderate tightness, and an opiate draught was given every six hours. During the next few days the flow of urine increased to four pints in twenty-four hours, and the albuminuria proportionately decreased.

I took the earliest opportunity of making a careful physical examination of the abdomen. The liver was "very slightly enlarged"—these are the words in my notes of the case; but beyond this I was unable to discover anything unnatural. It was in one sense disappointing to find so little sign of morbid change; but it gave a backbone to a favourable prognosis. My patient regained his strength rapidly, and was out of bed for several hours every day. His daily consumption of milk amounted to two quarts, and it seemed to be well digested. I now kept his bowels sufficiently moved by half an ounce of castor oil on alternate mornings, changing it sometimes for three drachms of sulphate of magnesia (dissolved in half a tumblerful of water). Ten grains of iodide of potassium were added to each dose of the acetate of potash and digitalis mixture. On the 19th of April, 30 minims of tincture of perchloride of iron were substituted for the digitalis and iodide of potassium. This medicinal treatment was continued without alteration until the 12th of May; but the abdomen rapidly refilled. And about this time he "took cold," which confined him to bed for a few days, and obliged me to stop the tonic medicines.

On the 28th of May my patient was again tapped, and eleven pints of fluid withdrawn. As soon as possible the iron and acetate of potash mixture was resumed, and the bowels kept slightly relaxed by the same plan as before. After the 10th of June the iron was given without the alkali, and to retard the re-accumulation of fluid in the abdomen an occasional brisk purgative of podophyllin and elaterium was taken at night. As the weather had now become very warm, E. H. was allowed to have a walk out of doors every day, and he rapidly got back flesh and strength.

And so things went on prosperously through the summer with this noteworthy point, that the fluid returned in the abdomen to a small extent (under three pints, as nearly as I could guess), and then stopped. The œdema had entirely left the lower limbs, and he could walk as well as ever. The memorable heat of July and August suited him exactly. I saw him about once a fortnight, and on my arrival home after a short holiday at the beginning of September he was well enough to go to the sea-side. The ascites had so receded as to be practically

non-existent, and there was only a trace of albumen in the urine.

During the past twelvemonth I have seen E. H. at regular intervals, and on the last occasion (September 9, 1877) he seemed in perfect health.

Commentary.—Ascites is a symptom which by its very magnitude may be called a disease. It is an effect which becomes a cause of other effects, scarcely less important and abiding. And so intricately are the static and dynamic phenomena of ascites bound up together that the keenest clinical insight cannot always separate and classify them.

When a medical man is called to a case in which abdominal dropsy is a prominent feature, he may be excused for some hesitation in giving a confident diagnosis. The abdominal viscera are under a watery veil, and perhaps can be hardly felt or even dimly discerned. There are, however, two points the determination of which is of high importance, and will to a large degree govern the prognosis. What is the condition of the heart and of the kidneys? The pathological interdependence of these organs is a medical proverb; but we cannot always see at the first glance which organ was originally at fault. In the present case, the heart was above all suspicion. Beyond mere weakness neither its valves nor its muscular apparatus could be proved to have a flaw. There was nothing demonstrably wrong about the other thoracic organs. The upper limbs were free from dropsy. There was no reason to imagine albuminuric retinitis, and of subconjunctival œdema there was not a trace. And there never had been any approach to delirium, or the slightest impairment of the intellectual powers.

Coming then to the part of the body below the diaphragm, the fact that the dropsy began in the abdomen would of itself free the heart and lungs from any complicity in the matter. On interrogating the kidneys, there seemed little reason to believe that those organs had suffered any serious morbid change. The scanty secretion of turbid urine was probably due to the backward pressure of the ascitic fluid upon the renal blood-vessels: and it was fair to hope that the albuminuria was only of the congestive kind. The ulterior history of the patient proved that this view was strictly correct; for the function of

the kidneys was restored in exact proportion to the removal of the dropsical pressure from them. The œdema of the lower limbs was capable of a similar explanation, and was obviously due to the tremendous pressure upon the great veins within the abdomen. The state of the liver seemed, at the outset of the inquiry, a cardinal point for investigation. But although the long tropical or sub-tropical residence of the patient suggested the theory of structural mischief in the liver, yet during the fourteen years that he had subsequently lived in this country there had been no illness which could be fairly attributed to this cause. His uniform sobriety and steadiness of conduct, winning for him terms of eulogy such as one seldom reads in the "discharge-papers" of any soldier, negatived the possibility of cirrhosis from alcoholic drinks. There was no material enlargement of the superficial veins of the abdomen, and certainly no approach to jaundice. There was little substantial evidence of any other disease of the liver, except perhaps a casual perihepatitis; and after the abdomen had been emptied by tapping, I could detect no enlargement of the spleen.

By a process of exclusion, therefore, I was compelled to think of an altered condition of the peritoneum itself as the probable source of the ascites. The hypothesis of strumous or malignant disease of the peritoneum was dismissed as unlikely, as no tumour or thickening could be detected in the abdomen, and the patient had no signs of a scrofulous or a cancerous diathesis. That the effusion was the result of a slow inflammatory action, seemed to be in most accordance with the clinical facts, and with the way in which the illness began. It is remarkable, however, that during my long attendance there was no indication of any pyrexia.

Dr. Hilton Fagge says that the prognosis of almost all cases of ascites is very unfavourable; but he adds that when recovery occurs, the great probability is that the dropsy was the result of either a chronic peritonitis or a perihepatitis. Most practitioners must be familiar with those cases of the disease in which repeated tapping affords only temporary benefit, and death happens sooner or later from loss of appetite and general exhaustion. The more frequently we relieve the patient of his watery burden, the more quickly does the fluid come back again;

and our very anxiety to bring present ease hurries the sick man to the sure and certain issue of a "watery grave." Dr. Murchison alludes to particular cases which seem to constitute a connecting link between inflammation and dropsy of the peritoneum where the attack begins with symptoms of sub-acute inflammation, but subsequently takes on more the characters of dropsy. The effusion in these cases often rapidly disappears under treatment.

A few words will be a sufficient commentary on the therapeutic management of this case. Clearly the first indication was to establish a copious flux from the bowels, by which the congestion of many organs might be relieved. As an adjunct to other drastic purgatives gamboge was long ago recommended by Sir R. Christison; and in the present instance it seemed very useful. The digitalis was prescribed with the view of augmenting the blood-pressure, according to the doctrine lately propounded by Professor Ackermann, of Rostock. A greater blood-pressure means a quicker circulation through excretory glands, and a more continuous process of elimination. And digitalis would help to correct any of the dropsical condition which might happen to depend upon mere feebleness of heart. The long administration of iron was not only of benefit to the general health, but distinctly promoted the absorption of the residual ascites after the second tapping. Lastly, it may be mentioned that I have always followed Dr. Basham's plan of bandaging the abdomen after paracentesis, and it seems to do good both by affording support and by checking the re-accumulation of fluid.

NOTE ON THE ADMINISTRATION OF IRON IN PULMONARY PHTHISIS AND SENILE ANÆMIA.

BY R. W. CRIGHTON, M.D.,

Physician to the Tavistock Dispensary.

THE many excellent rules and observations for the administration of iron in various diseases, given by Dr. M. Fothergill in his clear and pointed article "When Not to Give Iron," in the *Practitioner* for September, have given me great pleasure as coinciding in most instances with my own experience. I am obliged, however, to differ from his conclusions in two very important classes of cases, viz. tubercular phthisis and senile anæmia.

I have for more than a quarter of a century watched closely the results of the treatment of pulmonary phthisis by the different therapeutic agents most in repute; and I feel convinced that, when judiciously used, iron stands highest in the list, next to cod-liver oil.

It would, however, be quite impossible to use the remedy in a very great many cases in which I have found it distinctly of great value, if Dr. Fothergill's rule—never to give iron when the tongue is red and irritable—were strictly observed.

Contrary to his experience, I have generally been able to give iron with advantage in these cases; usually the perchloride with quinine, once or twice a-day after meals—and, if any signs of intestinal irritation occurred, a dose of bismuth at bed-time, or occasionally small doses of morphia and glycerine with the iron.

Some of the most remarkable recoveries from far advanced phthisis which I have seen have been under this method of

treatment, conjoined with cod-liver oil, where possible, and the application of the linim. iodi to the chest-wells. In early phthisis, with very rapid pulse and high temperature, I have found these often considerably reduced, and the general condition much improved by the combination, for a time, of the iron with digitalis.

A tongue loaded with fur certainly contra-indicates the use of iron; but a preternaturally clean, or irritable condition, according to my experience, does not of necessity do so in phthisis, otherwise I feel sure I should have failed to benefit many scores of cases which I have had the pleasure of seeing do well under its use in these circumstances.

I should, therefore, feel extremely reluctant to abandon the use of iron in any case of phthisis, simply from the patient having a preternaturally clean, or irritable state of tongue.

In senile anæmia, I have often witnessed the greatest improvement in giving iron; in fact, in very advanced life, I consider it to be one of the main indications of treatment.

The power of the digestive organs to assimilate it, as Dr. Fothergill remarks, is, however, much weaker than in infancy or middle life; consequently much smaller doses are required, and often the very mildest preparations.

In weak states of digestion, with flatulence and sluggishness of the liver, the saccharine carbonate with phosphate of soda, rhubarb, and ginger forms a suitable means of remedying both the anæmia and the state of the digestive organs.

In many cases, however, the perchloride with some preparation of pepsine may be given once a-day after dinner; and the same preparation (in large doses) in many cases of great anæmia with enlarged prostate.

In but few cases, I believe, will it be "better to give them tonics with alkalies and easily digestible food than to give iron."

ON REFLEX, ECCENTRIC, OR IRRITATIVE ALBUMINURIA.[1]

BY DR. G. DE GORREQUER GRIFFITH,

Senior Physician to the Hospital for Women and Children; Consulting Physician-Accoucheur to St. Saviour's Maternity.

MANY instances which I would catalogue under this form of albuminuria have passed before me; but I shall at this time be content to relate only one case, that of Miss M., since it is a most distinctly typical case admirably illustrative of my meaning.

She had applied to me a few years previously complaining of her general health being bad.

Finding tubercular symptoms in the lungs, I had sent her to Egypt to winter, with the best results to her condition. On her return she complained of being teased with a discharge from the anus. Examination revealed a fistula, on which I operated on July 10th, 1871. This was dressed in the usual way; in a few days she showed signs of uræmic poisoning, which made me discontinue the dressing, reasoning with myself, that *it* was the occasion of the grave conditions present. I examined the water which the nurse gave me, and found it loaded with albumen; not satisfied, however, with this, thinking that some purulent discharge might have got commingled, I drew off the water with the male catheter, and then subjected it to examination. It was as loaded as before; very little found its way at all into the bladder—the kidneys seeming to have their functions almost quite arrested.

As, owing to the sympathetic irritable condition of the urethra, which had come on in the course of the daily dressing

[1] Read at the Manchester meeting of the Brit. Med. Association held Aug. 1877.

of the wound, no urine could be voided voluntarily, I discontinued the dressing at once; swept out the bowels by means of compound powder of jalap, and the kidneys by diuretics: after a few days the albumen and the attendant symptoms all disappeared, and my patient was herself again.

I resumed the dressing of the wound, and the symptoms all returned, compelling me again to desist. Cautiously I commenced the dressing a third time, using as little as is consistent with utility, so as to induce the least possible irritation and disturbance, all the time carefully examining the water to detect the very first trace of albumen. The dressing is well borne, the system seemingly quite tolerant of it; no albuminuria obtains; no bad symptoms arise, the wound heals, the patient recovers, and is at this date alive, and in better health than she has been for a very long time.

I think there is little doubt but that the dressing was the immediate cause of the albuminuria, and all the grave symptoms; the irritation occasioned by its insertion into the wound producing a stasis of the blood in the kidneys, congestion of the renal circulation, arrest of the urinary secretion, and transudation or exudation of the albuminoid elements of the blood; the uræmic or albuminurial symptoms supervening at the last. I do not think it likely that the appearance of the albumen was owing to the admixture of any discharge from the wound, since I guarded against the possibility of this by carefully drawing off the water with the catheter, and taking every precaution against such an accident. Nor do I consider the presence of the albumen due to any endosmosis, that is, passing of the albuminoid of the discharge from the surfaces of the wound into the renal veins, and thence its exodus and transmission along with the urine; nor can I fall in with the view that by any process of absorption it passed into those vessels, or even more directly into the contiguous bladder, whence it was ready for withdrawal.

I must add that at the time of my attendance upon this lady I had my mind greatly exercised upon a somewhat identical case, which had terminated fatally, and, reasoning on both of them, I feared the death of *my* patient from albuminurial or uræmic poisoning, were I to persist with the dressing. I feel convinced that had I not recognised the condition, *and*

the cause of it, a fatal result must have ensued. I can understand how the temporary symptoms, if I may use the expression, would have passed into the permanent, showing that remedial derangement had proceeded to irremediable, organic, disorganization, the end of which could alone be death: how the first symptoms—irritation from dressings—stasis of blood in the renal veins, congestion of the entire renal circulatory system—veins and arteries—arrest of urinary secretion—would result in such structural, organic changes in the kidneys themselves, as would be manifestly evident in them at post-mortem examination—structural changes incompatible with life: how in fact, what was at first mere functional derangement would, if the irritation were persisted in, become developed into organic disorganization, inducing in its turn destructive uræmia, or albuminuria, and that in this way Irritative Albuminuria, an ailment merely temporary, because perfectly remediable, if unrecognised and misunderstood, would be converted into incurable and rapidly fatal albuminuria, dependent on true permanent kidney disease—such not having existed previous to the irritation.

I am persuaded that many cases of this kind of albuminuria exist, wherein local irritation sets up renal disturbance and uræmic poisoning, that direct our attention to the examination of the urine, in which we *then* find albumen in varying quantities. In how many instances of catheter passing for stricture of the urethra, of lithotrity, especially if the crushing has to be done often, or if not so frequently, yet producing great irritation and disturbance; in how many cases of operative procedures about the generative-urinary organs, especially if complicated with repeated manipulations, do we not know that it may be said, "We examined the urine up to the very morning of the day of our operation, we carefully investigated the conditions of the bladder and of the kidneys, and found nothing wrong: all was well: our patient had not a bad symptom for some days after that on which we commenced our manipulations; then suddenly he fell into an alarming state—the uræmic or albuminurial condition—and we very nearly lost him;" or, as has often had to be said, "our patient slipped through our fingers"?

The apparently sudden onsets of the gravest albuminuria symptoms are really not so dangerous as when they creep stealthily over the patient; because in the former instances they often assume such an alarming form that the surgeon desists from any operative, or even dressing-of-wound measures; without perhaps a suspicion that he is actually the cause of all the danger—and desisting simply because of the hopeless condition of the patient; the symptoms subsiding with the cessation of irritation, and finally disappearing altogether, unless the irritation be renewed. Whereas, when symptoms come on gradually they may not be recognised until they have slowly passed into the gravest, and then the functional disturbance may have proceeded into organic disease and become incurable. "The symptoms may not be recognised," I have said. They absolutely may be unrecognised; or practically they may be, because the surgeon may not for one moment have thought that his operative procedures, or his manipulations, are at fault—are in fact the cause of all the ills; and hence, though he may take the usual corrective steps for the recovery of his patient, yet he must of necessity be foiled, since he is unaware that the one hand, by continuing operative measures, or even dressings, is undoing what he is seeking to do with the other hand, wherewith he prescribes internal medicines; his best efforts are countervailed—by the renal mischief he thinks, but in reality it is by the insistance of irritation on his own part.

These are the few observations I wish to lay before you at present on this hitherto undescribed affection, Reflex, Eccentric, or Irritative Albuminuria.

AUSTRALASIA AND SOUTH AFRICA AS HEALTH-RESORTS, ESPECIALLY FOR CONSUMPTIVE INVALIDS.

BY C. FABER, M.D., OF STUTTGART,
Late Resident Medical Officer to the German Hospital, London.

THE Cape of Good Hope has been for years back a favourite health-resort with invalid Anglo-Indians, and before the Suez Canal was opened it was even more so than it is now. It was then the half-way house to England on the sea-route from India, and its sunny, dry climate induced many an invalid to stop there instead of going on to the dear, but foggy and rainy mother-country.

Australasia has only of late years come into fashion as a health-resort, but in this, as in other respects, it has quickly outstripped the Cape. The cabins of those fine, commodious sailing-vessels going out to Australia, of which I have spoken at some length in a former paper ("On the Influence of Sea-voyages on the Human Body, and their Value in the Treatment of Consumption:" chapter VI. On the Choice of the Sea-routes, and of the Vessel best suited for a Therapeutical Purpose, with Practical Hints regarding the Outfit of an Invalid, the Accommodation, and the Life on Board. *Practitioner*, November, 1877), are, at a certain season, full of invalids, mostly consumptive. Part of them go there for the sake of the voyage only; others with the intention of remaining for a longer period, or even for the rest of their lifetime.

But even those invalids who have taken a trip to Australia for the sake of the voyage only will have to stay on land for some time. In the first place, there is not always a ship ready for sailing to take them back again. Their own wishes too will prompt those who are not exhausted mentally or physically,

after a long, monotonous voyage, to take a glance at that "country of paradoxes," to know something of its physical features, its people, and the life there. And last, but not least, there are strong medical reasons why an invalid should break the voyage by a stay on land of at least some weeks, or better still, some months. These have been explained at full in my former paper (Chapter V. On the Influence of Sea-climate and Sea-life on the Constitution in general, and on the Health of Sailors and Passengers, particularly Consumptive Invalids. *Practitioner*, October, 1877), where I have shown how the benefit derived from a sea-voyage is, beyond a certain limit, by no means in direct proportion to its duration, but, on the contrary, all the good derived from it at first may be again undone in consequence of the very length of the voyage.

Whatever the length of the invalid's stay on land may be, it is of the greatest importance to him that he should choose a suitable place, where his delicate health may be improved and not still more impaired.

In the introduction to my medico-nautical papers (*Practitioner*, March, 1876), when speaking of sea-voyages coming as a fashionable remedy nowadays in the treatment of consumption, I have had to point out the general want of an accurate knowledge regarding them and their complex mode of action, amongst medical men, as well as amongst the patients whom they advise to take them, and to whose discretion everything is practically left in this kind of climatic treatment. I have further pointed out that mistakes arising therefrom are very frequent, and often of the saddest consequences imaginable.

The same applies to the use of the Australian climate as a remedy in the treatment of consumption. Here, too, an accurate knowledge is generally wanting, and the results, therefore, are in many cases far from satisfactory, the patient, instead of recovering his health, succumbing rapidly, and finding nothing but a lonely grave at the antipodes. Of the Australian climate in general and its therapeutical character only a few members of the medical profession in Great Britain, whence the invalids to Australia almost exclusively come, have any notion beyond the superficial one that it is classed among the dry, warm, and stimulating climates.

Just think what pains a physician takes when he is going to send a patient to some European health-resort, to discriminate among them. Will Malaga, Pau, the south coast of France, the Riviera—and which of the numerous places there ?—will Naples, Sicily, Davos, &c., suit him best ? There is certainly no nicety lost in deciding between different localities, even when they are only a few miles distant from each other; and volumes of literature are at our command to help us out of the difficulty, or rather—to perplex us still more, each place being lauded to the skies by its own local writers, and by the others run down. In the case of Australia—a whole continent !—there is nothing of the kind. The patient is indiscriminately sent " to Australia," as a whole, and he has to find for himself a place of residence, suitable or not suitable, as luck will have it. I have seen pitiful instances of this description. The consequence is that such unguided and undecided people linger about the place of arrival, that is, one of the large Australian cities, Melbourne or Sydney, the very worst thing they can do, as will be shown later on.

The principal purpose, therefore, of this paper is to give such information as will help to prevent therapeutical mistakes, and to insure the greatest possible benefit to invalids resorting to the antipodes for their health. I trust, too, that I shall give this information as fully as is necessary, for I have examined the subject in all its bearings.

In the first place, in order to get a reliable and positive foundation for this treatise on the *Medical Climatology of Australasia*, I have taken pains to procure the latest and most comprehensive official reports on the meteorology and the vital statistics of the Australasian colonies, and it is with great pleasure that I acknowledge the courtesy and promptness with which all their Agents-General at London have furnished me with their several Blue-books.

One advantage of letting figures speak for themselves as much as possible is of a personal character. It is the best way, if there be any, of keeping clear of those local susceptibilities which an outside writer on any climatic health-resort, if not implicitly eulogising, is almost sure to excite and bring down upon himself.

I do not, however, wish it to be understood that I put implicit faith in those statistics. If errors, which in this case lie almost

entirely on the side of omission, not on that of commission—I say, if such errors are found to be unavoidable in our Old World's statistics, how much more must they occur in countries of such recent date as the Australasian Colonies of Great Britain are, with so fluctuating a population. The larger the figures the more can the results of statistics be trusted.

As regards the climate of Australia, a long run of years to draw conclusions from is the more desirable as it is characterised by great irregularity.

As for vital statistics, we must observe that the population is not yet settled down, and immigration is still going on to a large extent. The numerical relations of the different ages and of the sexes have therefore not yet arrived at the normal standard. Besides this, the population is very small, considering the large area over which it is scattered, and its vital statistics cannot be controlled so exactly as those of the counties of England. At the end of 1875 the whole population of British Australasia amounted to 2,278,614 people only, a figure which falls short by several hundred thousands of the number of square miles Australasia contains.

The very fact, however, of these colonies, the youngest of all, having official statistics at all on climate and vital statistics, which older ones, for instance Cape Colony, have not, speaks greatly in favour of their rapidly-acquired, though "ready made" imported civilisation; and, what is still more, that those statistics are as good as they can be under the circumstances. I do not think there is another example in the history of colonisation of such a rapid development, or rather transplantation on a large scale, of European civilisation as the Australasian colonies present. They are the most brilliant exploit of that truly British gift of colonisation.

On the Climates of Australasia.

The term "Australasia," as it is used here, includes the continent of Australia, Tasmania, and New Zealand, countries which, as geological researches show, formerly were not separated from one another by the ocean, but formed one continent. Beside this geological, there is also a political, relationship

between them: they all are dependencies of Great Britain. It is therefore of the *Medical Climatology of British Australasia* that I am going to write.

I may well take it for granted that every one of my readers is well enough acquainted with the geography of Australasia to spare me a geographical introduction. But one circumstance, which is neither so well known nor so readily kept in mind, is the circumstance that by its extent from north to south—from 10° 43′ lat. S. (Cape York) to about 48° lat. S. (Stewart's Island) —Australasia must present a great variety of climates, from a completely tropical to an almost antarctic one.

In the second place, the relation between land and water causes different parts of Australasia to have very different climates: to wit, the compact Australian continent on the one hand, and oceanic, elongated, intersected New Zealand on the other.

Thirdly, the altitude produces great climatic differences even within a short distance. For instance, within the colony of New South Wales "all varieties may be found, from the cold of Kiandra—where frost, snow, and hail reign for a considerable portion of the year—to the heat of the inland plains, where the thermometer sometimes reaches 140° in the shade, and is for the greater part of the summer over 100°, and where rain enough to wet the ground is sometimes not seen for eighteen months."

Taken as a whole, and without yet entering into any local details, three different climatic zones may be distinguished in British Australasia, which form gradations from the dry, variable desert climate to the equable sea-climate, viz., the climates of the continent of Australia, of Tasmania, and of New Zealand.

The Climate of the Continent of Australia.

The object of this paper being mostly a practical one, I shall leave out of consideration those parts of Australia where immigrants, and particularly invalids, from Europe are not supposed to go, and of which, moreover, comparatively little is known in the way of meteorological and vital statistics, viz., tropical and West Australia.

The latter is very much out of the way, and is only known as a penal settlement, which, by the way, is a great eye-sore to the

other Australian colonies. I may mention, however, that its climate is said to be much the same as that of New South Wales, only more moist, and less liable to droughts and hot winds—those scourges of the other Australian colonies. West Australia might therefore, but for the circumstances mentioned, prove the best of all the Australian health-resorts.

There are two all-important climatic agents upon which the extension of organic life, and in particular of human habitations, depends—atmospheric temperature and rainfall. Where the former is below a certain point, or where there is too little or no rain, organic life cannot develop: in the first case there is nothing but snow and ice, in the second nothing but desert. It is the latter factor, viz., deficiency and, still more, irregularity in the rainfall, which makes Australia the most barren and wretched of continents, worse even than Africa; for with the exception of a comparatively narrow and not even uninterrupted strip of country along the coast, it is covered by meagre prairies and, further inland, by desert.

Indeed, Nature has dealt in the most step-motherly way with poor Australia. It is, in this respect, the very opposite to the continent of South America, from which it is separated by the Pacific Ocean. There are two great reasons for this difference, the first of which lies in their respective shape and relations to the meridian and equator, the second in their orographical features.

South America is of a slender shape, though little intersected by the sea. The shape of the Australian continent bears a striking resemblance to that of clumsy Africa, though I have nowhere seen it pointed out. Yet, one has only to take a map of the world in hand to satisfy himself regarding the resemblance.

The Great Australian Bight corresponds exactly with the Gulf of Guinea. The east coast of Australia, abutting to the southward into Cape Wilson, to the northward into Cape Horn, corresponds with that of Africa and with Capes Agulhas and Guardafui respectively. Torres Straits have their African parallel in the Straits of Babel Mandeb, the Gulf of Carpentaria in the indenture, though not so deep as that made by the Red Sea. That

other one, upon which the coast of Tripoli borders, is, on the contrary, deeper than its Australian pendant, the Gulf of Cambridge. Cape Londonderry, then, corresponds with Cape Bon, opposite Sicily; North-west Cape with Cape Espartero, joining the Straits of Gibraltar; Cape Leeuwin with Cape Palmas.

But to return from this geographical parallel, which might be extended a great deal more, to that opposite pendant of South America. By having its axis running from north to south, it intercepts the moisture-laden trade-winds to the largest possible extent, whilst Australia, with its axis parallel to the equator, offers a much smaller proportion of its coast-line to those winds.

But the point of paramount importance to the development of organic life on either continent is the way their mountain-ranges are respectively arranged. On the east coast of America there are no mountain-ranges high enough to present a barrier to the air-currents from the Atlantic and to intercept the moisture they carry with them, to any marked extent. It is only on the west coast of America that you have such—the Andes and the Rocky Mountains—and it is here, in the keen mountain air, that those vapours from the Atlantic Ocean are condensed into rain so copious as to give rise to the grandest rivers of the globe —the Amazon, Mississippi, and River Plate, and to cover the continent with a vegetation, the luxuriance of which—at least in the case of South America—has not its equal in the world.

Unfortunately for Australia, here the highest mountain ranges, the backbone of the continent—Australian Alps, Blue Mountains—run along the east or windward coast, and thus intercept a large proportion of the moisture that comes from the Pacific Ocean.

Whilst in the Colony of Queensland, for instance, according to the official report the rainfall at the sea-coast stations amounted in 1875 to 103·28 inches, at the stations beyond the coast-range it was very much less; so at Condamine, which is 180 miles inland, it was 19·95 inches, at Charleville, 350 miles from the sea-coast, 19·51 inches, at Beechall Downs, 500 miles inland, 18·95 inches. It is to be remarked that the year 1875 was an unusually wet one. In the Colony of New South Wales also we have the same difference. At Sydney, for instance, the

rainfall amounted in 1874 to 63·600 inches, but at Doniliquin, 287 miles inland, it was 18·270 inches, at Fort Rourke, 393 miles distant from the east coast, only 11·900 inches. Often not a drop of rain falls for months and even years together in districts beyond the coast-range. On the Bogan River in New South Wales no rain fell for thirty-seven months; and only five inches of rain fell at a place near the Darling Downs during five years.

Thus it is that to the leeward of the eastern coast-ranges the prairie commences, which gets poorer and poorer the farther inland we go, until it blends with the vast central desert.

The Riverina, *i.e.* that district of New South Wales which lies between the Rivers Murray and Darling and west of those coast ranges, is considered one of the richest, if not the richest, pasture districts of all Australia, and when looking at the map and seeing it traversed by innumerable rivers and creeks one might indeed fancy one would find a country full of the rankest verdure. But unfortunately those rivers and creeks exist for the most time on paper only, and when I was there, which was, however, in the hot season, I found a country perfectly scorched and destitute of all verdure except that dull and melancholy green which is all the ubiquitous eucalypti can offer.

What little atmospheric moisture is left to them after the air currents from the Pacific Ocean have passed the coast-range is, at least in the hot season, when rain is most wanted, prevented from condensing and coming down on the parched land in the shape of beneficial rain by the furnace-like irradiation of heat from the barren soil of the desert. Thus the explorers who have intrepidly visited and in only too many cases have lost their lives in penetrating into that central desert, tell us of clouds rising up the horizon, but dissolving again like a *fata morgana* without discharging any of their precious moisture, to the sad disappointment of their party, that were perishing with thirst. The heated air that rises up from the surface of the desert or the parched prairie mixes with those condensed vapours (clouds) and again dissolves them.

In this way also is to be explained the existence of those vast prairies or Pampas on the River Plate in South America, which lie in nearly the same latitudes with the Riverina, and in

their physical and climatic features bear a great resemblance to the Australian prairies. At first sight the existence of the Pampas seems to contradict what has been said regarding the origin of the Australian prairies, there being in the case of the Pampas of South America no mountain-ranges between them and the ocean to intercept the rain. This circumstance is, however, only one of several causes which make the rainfall scarce and far between, and thereby render those countries what they are, viz., prairies, which during part of the year are perfectly parched and their vegetation withered. Both in South America and in Australia they form, for the most part, a dead level which has little, if any, elevation above the sea; and, indeed, certain parts of the interior of Australia are said to be below the sea-level.

The moist sea-breezes will travel over those plains without ever being arrested, and as has been shown, there is not even a possibility of their vapours being condensed into rain so long as the vertical irradiation of heat from the plains continues as it does in summer.

Thirdly, their geological character helps to make the countries what they are. Their sandy soil allows the rain-water, if there be any, rapidly to disappear beneath the surface to a depth where it is of little use to vegetation. Many a large Australian river never reaches the sea, but is lost in the sand.

Evaporation also, in a dry climate like the Australian one, takes a large part in depriving the soil of that amount of moisture which is necessary for the growth of a more highly developed vegetation, especially of all trees, except the very toughest and most resistent to the influences of the climate.

The first general feature, then, to be mentioned of the Australian climate is its *aridness.*

It has been said that this has increased considerably since colonisation took place, in consequence of the cutting and burning down of the forests. I, for my own part, do not think that in the case of Australia so much importance should be attached to this fact.

In the first place, by far the greatest part of the continent consists of prairies and deserts, where, on account of scarcity and irregularity of rainfall and the blasting effects of the hot wind, trees never could nor will grow beyond the height of the

ill-omened scrub, with its thorny plants, which make the traveller prefer the bare sand of the desert.

The future prospects of the Australian colonies as regards their extension farther inland are certainly by no means bright, and their limits in this direction have already been reached. In North America colonisation steadily spread from east to west, the huntsman and the shepherd receding before the agriculturist. In Australia such a steady progress of prosperous development is cut short by the climate.

The second reason why the climate, and especially the rainfall, cannot materially be influenced by the existence or absence of forests, is that the area is too large. For just as the total amount of rainfall all over the globe will be the same independently of the existence or non-existence of forests, so will it be in Australia, although, of course, in a minor degree. There is, however, no doubt that forests exercise no little influence on the *local* distribution of the rainfall, and it is therefore quite probable that this or that locality in Australia, or even a whole colony, has become drier since the wholesale destruction of the forests on the coast. The island of St. Helena, for instance, with an area of forty-seven square miles, has nowadays double the amount of rainfall which it had at the time of Napoleon's captivity, trees having since been planted to a large extent. Even over much larger areas, as, for instance, over France, the influence of forests on the amount of annual rainfall is felt, their unreasonable destruction being followed by a proportionate diminution in the rainfall, and by increasing sterility of the soil. Those districts of Australia where trees grow at all have not, however, seemed to me to be much denuded. The coast ranges especially, to which I have assigned great importance in the climatology of Australia, are still covered with forests, in which there is only here and there, oasis-like, a clearing.

But in Australia the forest, or as the colonists call it, the bush, from its peculiar character, has no such great influence on the local distribution of the rainfall as might be expected from the instances above stated, especially that of St. Helena. It is mostly composed of different species of eucalypti, or gum-trees, some of which grow to a gigantic height, only equalled by the Wellingtonias of California. As they only begin to branch after

they have reached a great height, and as their leathery leaves are narrow and lancet-shaped, and hang down in a more or less vertical direction, it may well be understood that little shade is to be expected from the ordinary Australian forest-tree. Nor have I seen in the primeval forests on the continent of Australia any underwood to speak of, except in the moist atmosphere of mountain "gullies," whilst I found it luxuriant in the island of Tasmania, with the same giant eucalypti high above.

Thus the difference in atmospheric temperature between forest and open country, upon which the influence of the former on the local distribution of rain depends—forests attract the rain, as the popular saying is—is considerably lessened in Australia, the sun's rays and air currents having an almost unimpeded access into, or through, the Australian forest. In my strolls through it, I well remember how much I missed the shade our European woods give; for amidst a primeval forest I was almost scorched by the summer sun shining down upon my head with its full strength.

Therefore I should not think it of much use to replant trees —at least not eucalypti!—where they have been cut or burnt down, in order to attract more rain, and still less so to plant trees where there have been none before, viz., in the prairies and deserts of the interior. Where rain is so scanty, and where the intervals between the falls are not merely long but exceedingly irregular, sometimes extending to months, sometimes to years, and where there is no permanent supply of ground-water sufficiently near the surface to reach their roots, trees will not grow; therefore I cannot see how the inland prairies, to say nothing of the deserts, can ever be rendered available for agricultural purposes by this plan alone. Yet an attempt might be made in places that appear not utterly unsuited by their climate and geological character, not, however, by planting eucalypti, but more succulent and shady trees.

Quite recently attention has been drawn by the Consul of the United States at Columbia, in Peru, to a tree called there tamai-caspi, or rain-tree, which grows in the woods near the village of Moyobomba. This tree has the peculiarity of absorbing into and condensing within its structure any moisture from the

surrounding atmosphere with such an astounding energy, or rather insatiability, that water is said to continually trickle out on its surface, and to drizzle down like rain on the ground, thereby rendering the latter quite boggy. And, what is particularly to our purpose, it is when the rivers are dried up during summer, and water is most scarce, that this curious tree gives off the most water. It is intended to plant these trees in the arid plains of Peru—and most veritable deserts, though naturally of limited extent, there are in that country—in order to make this climate and soil moister. If this experiment should succeed in Peru, there is no reason why it should not do so also in the interior of Australia, their climates being much alike, for the same orographical conditions, viz., high mountain-ranges to the rainward, which intercept the rain and keep it off the parts lying beyond, exist in both countries.

A second plan that occurs to me, to rescue Australia from its present arid condition, and make its interior habitable and fit to be cultivated, would be to sink artesian wells from place to place, as has been done with success at some points of the northern portion of the Sahara desert. But not only will wells have to be sunk, as a rule, to a considerable depth in the sandy soil of the Australian desert, but, what is the greatest objection, the water found there is mostly so brackish as to be almost, if not quite useless. This fact has only recently been confirmed by the experiences of the expeditions by which the telegraph from south to west Australia was laid.

A third plan to improve the water-supply of Australia, and thereby her prospects of a more steady national prosperity, and that in my opinion not at all the worst one, would be to economise as much as possible the rain that comes down in rare but most violent floods, and is carried away rapidly to the sea by way of short-lived torrents, or lost in the sand or swamps. This could be done by damming these torrents up into artificial lakes, from which the water could be given off as needed to the country round by means of channels.

And last—not least—but on the contrary the grandest project, if feasible, would be to let, in the same way as has been proposed with regard to the Sahara, the sea enter into the interior

of Australia, which to a large extent—Lake Torrens,[1] for instance —is said to lie below the level of the sea. Spencer Gulf, in South Australia, is only separated by a few miles of land from the said lake, which, however, deserves this name only after heavy rains. From thence it probably would not be difficult to establish a communication with Lake Eyre and the delta of the Barcoo, which is said to be by far the most extensive in the world, but unfortunately one for the most part without water.

That the Australian desert, like the Sahara, has been covered by sea to a large extent at a geological period not very remote, is shown by the brackish nature of the water found there and by snow-like incrustations of salt that cover vast tracts of the Australian desert.

The second general characteristic of the Australian climate is its *irregularity* and *changeability*.

Australia is the "land of paradoxes," and to this, as has been seen and will be seen still more in detail, its climate bears as much testimony in its way as its fauna and flora, which will not be wondered at when we remember that if climate and organic life do not stand in the direct relation of cause and effect, yet the latter "adapts itself" to the former. It is the antagonism of two climates as different as can be, the desert- and the sea-climate, that, as will be shown more explicitly later on, when speaking of the temperature, renders the Australian climate so irregular and variable.

From what has been said in giving a general outline of the Australian climate, one can almost, I think, picture to himself the character of *Australian scenery*. On the whole, it certainly is not such as to "warm the heart and elevate the mind." No one who has travelled through the colony of Victoria can help thinking how the other parts of the country must be if this territory could be called "*Australia felix*" by its first explorer, Sir Thomas Mitchell. The mountains with their fern-clad gullies are almost the only oases interrupting the vast monotony of the Australian landscape, even where the country cannot be called a desert.

[1] According to barometrical observations, however, made in 1858 by Ch. Gregory, at least the north-east end of Lake Torrens is a little above the level of the sea.

Apropos of oases and desert, I may here mention that Australia has its *fata morganas*, one of which I have, to my surprise, seen at a very short distance from the sea one evening after a very hot day in midsummer.

Monotony of scenery is no small disadvantage in a climato-therapeutical respect, and the beneficial influence of fine scenery on the mind and general constitution of an invalid, especially by way of contrast after a long sea-voyage, must not be undervalued, though it cannot be exactly estimated. In the combination of a fine climate with beautiful scenery lies the secret of Italy's never-dying charm for invalids, who still will crowd there even when they know that they never will be cured, but will find their grave in Italian soil; thus, in a certain sense, rendering the proud expression true, "See Naples and die!"

There is, however, one feature of the Australian climate which compensates to some extent for the monotony and dreariness of the scenery. It is the *serenity of the sky*, the *transparency of the air*, and a certain exciting something in it which perhaps most appropriately might be termed elasticity, that being the feeling it excites. This state of the atmosphere is, however, not nearly so constant as in other dry and warm climates, such as Egypt.

Its effect is, particularly to the new-comer, a striking one. One feels so light, buoyant, and elastic. The step seems to rebound from the ground; the heart to expand and overflow from joy in everything around, even were it only the most common Australian landscape. In our own climate we have something like it, when spring suddenly breaks forth after a long and hard winter.

Of course that exulting feeling after some time becomes blunted. If this were not the case, the strain on the nervous system, though of a pleasant character, must soon prove too much of a good thing. We shall, however, have once more to return to this feature of the Australian climate, when its effects on the character of the population and of their diseases come to be discussed.

ARE THERE LAWS OF THERAPEUTICS ?

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It has afforded me much pleasure to notice the remarks of Dr. Rabagliati on the laws of therapeutics in recent numbers of the *Practitioner*. That the views which I have repeatedly expressed agree in the main with those advanced by Dr. Rabagliati will be sufficiently apparent to any one who may like to refer to my communications to this journal upon the subject. But notwithstanding this agreement, there are one or two points, probably not fundamental ones, but yet sufficiently important, upon which our views totally differ.

In the September number, p. 169, when speaking of the local action of drugs, Dr. Rabagliati says: "The reason why these remedies act differently is now, and probably will be always, classed among the inexplicable phenomena which are called ultimate facts." In an article "On the Action of Alteratives" in the October number of last year (p. 339), I say, in reference to the law of the elective affinities of the tissues, "the law is, in short, not an ultimate but a derivative law, and science will resolve it some day into still more general and fundamental laws." In the article in question I gave the reasons which led me to this conclusion, and these need not be repeated here. What are Dr. Rabagliati's reasons for holding the contrary opinion? The only one which I can imagine is that this law has not yet been resolved, and that it is not very clear how it can be resolved into more fundamental ones. But the very essence of discovery is to render clear that which is obscure; and no

amount of present obscurity can of itself justify us in placing a problem beyond the reach of the science of the future.

The same idea is expressed by Dr. Rabagliati in the November number when he says (p. 334): "The determination of what quantity of a remedy is required to act upon a diseased organism is effected by the resistance of the organism, and something as yet unknown in the constitution of the remedy. There are no signs that this latter factor will soon be determined, or that we shall be able to offer any other explanation of it than that it is an ultimate fact."

And in proposition E, he says: "The time after which reaction succeeds action is different in the case of different remedies and of differently constituted bodies, and this also must be determined by experiment." The last clause of this proposition is somewhat ambiguous; but judging from the context, I take it to mean that we must accept the facts of the action and reaction of medicines in reference to time, on the experimental evidence; and that we are not able to explain, and probably never shall be able to explain, these facts by reference to more fundamental laws. But several laws are now known which help to bring into mutual relation, on the one hand, the constitution of the drug, and on the other, the degree of its action and the rapidity with which the action takes place. In an article which appeared in *The Liverpool and Manchester Medical and Surgical Reports* for 1876, entitled "Morpho-Physiology and General Pharmacology," I endeavoured to formulate several laws of the action of drugs, and some of these will, in my opinion, help to explain in a general way what Dr. Rabagliati thinks never can be explained. The explanation afforded is of course exceedingly general and vague; but the fact that any explanation is forthcoming, however defective it may be, affords grounds for hoping that the progress of science will render it more definite by the discovery of new laws, and the extension of old laws to the actions of a larger and larger number of drugs. I may be permitted to recapitulate such laws as have a bearing upon the degree of action produced by drugs, and the rapidity with which the action takes place, without stopping to illustrate these laws by specific examples.

1. Before an agent can produce a drug action it must be

quantitatively or qualitatively heterogeneous to the organism; and, other things being equal, the more heterogeneous an agent is to an organism the greater will be its effect.

2. Inorganic agents which play an important part in the formation of structure, such as iron, phosphorus, and sulphur, are either trivalent or some higher degree of atomicity; and, as a rule, the compounds of the elements which possess the higher degrees of atomicity, even when heterogeneous to the body, act as tonics, while the compounds of those which are univalent or bivalent are irritants. This law has a sufficient number of exceptions to show that irritant or tonic qualities must depend upon other properties than the atomicity of the agents.

3. The greater the molecular mobility of an agent, other things being equal, the sooner it gains entrance into the body through the absorbing surfaces, and the sooner it is eliminated; and also the more general and diffused will be the action it will produce upon the organism.

4. The compounds of the elements with massive atoms are relatively long in being absorbed, and correspondingly long in being eliminated; and when the agents form, like the metallic salts, stable compounds with albumen, the length of time before they are eliminated is much increased.

5. The more massive the molecule of the element, other things being equal, the more definite and local; in one word, the more specific will be its effect, and that of its compounds; and the smaller the quantity in the circulation which will be required to produce an appreciable effect.

6. In binary compounds both elements are represented in the effects, but the action of the heavier atomed element will predominate. This law may be traced in the action of compounds of a higher degree of complexity than the binary.

No one will be more ready than I to admit the great imperfections of these laws; but the fact that they bring the nature and degree of action of a certain number of agents into a certain kind of relationship with their physical constitution, makes us hope that the science of the future will convert this relationship, which is now so general and vague, into a relationship which will be exceedingly specific and definite.

Dr. Rabagliati has made a praiseworthy attempt to bring the

resistance of the organism to the action of drugs within the scope of the law of the conservation of energy ; but in saying that the local action of medicines, and the relationship between the physical constitution of drugs, and the kind and degree of action produced by them are ultimate facts, he is making an assertion which simply means that these facts are for ever beyond the reach of this great law, and cannot be brought within the scope of its operation. When Dr. Rabagliati fairly faces the full meaning of the language he employs, he will, in my opinion, be the first to repudiate the conclusion which it implies.

While on the subject of the meaning of language, I may be permitted to enter a protest against the use which Dr. Rabagliati makes of the term "phenomenal" in explaining the homœopathic law. Ever since Kant divided all existences into noumena and phenomena, the latter term and its cognates have had in philosophical works exceedingly definite meanings, and we cannot afford to lose the use of valuable words by permitting them to be employed in the vague sense adopted by Dr. Rabagliati. According to Kant the whole of our knowledge is phenomenal, and therefore, the explanation given by Dr. Rabagliati of the double action of medicines is like the homœopathic law, merely a phenomenal statement.[1]

The most original part of Dr. Rabagliati's papers is his suggestion to bring the action of drugs within the scope of the law of conservation of energy, by endeavouring to discover a "*unit of resistance* of the human organism" to the action of drugs. "My suggestion," says he, "would be to institute a comparison between the effects of such a drug as digitalis in lowering the heart's action, and the amount of cold required to produce the same effect." I have no doubt that such a comparison, if carefully conducted, might lead to some interesting results ; but these results would not be sufficiently simple and

[1] I would recommend the following quotation from Kant to Dr. Rabagliati's attentive study :—"Wenn wir denn also sagen : die Sinne stellen uns die Gegenstände vor, *wie sie erscheinen*, der Verstand aber, *wie sie sind*, so ist das Letztere nicht in transscendentaler, sondern blos empirischer, Bedeutung zu nehmen, nämlich, wie sie als Gegenstände der Erfahrung im durchgängigen Zusammenhange der Erscheinungen müssen vorgestellt werden, und nicht nach dem, was sie ausser der Beziehung auf mögliche Erfahrung und folglich auf Sinne überhaupt, mithin als Gegenstände des reinen Verstandes sein mögen."—Kant's *Kritik der reinen Vernunft*, Leipzig, 1868, s. 223.

accurate to render them fit to be placed at the foundations of a science. Besides, if ever a science of drug action is to be obtained, we must take cognisance not merely of the effects produced on man, or on any one class of organisms, but also of the effects produced on all organisms whatsoever. The great objection to Dr. Rabagliati's proposal is that he would have us begin with the most complex, instead of with the simplest organisms. It was by a study of the *elements* of the tissues of the higher organisms and of the lowest kinds of organisms that we obtained the conception of the cell or plastide as the *morphological unit;* and it was by a study of the action of fibres and of minute masses of protoplasm that the conception of irritability as the *functional unit* was developed, and if ever we are to obtain a *unit of resistance* of organisms to the action of drugs, it will be by experimenting on the elements of the tissues, and on unicellular organisms, and by carrying with us the conceptions obtained under these simple conditions to the explanation of the more complex phenomena presented by the higher organisms.

The statements which Dr. Rabagliati makes with respect to the contrariety between the primary and secondary effects of the actions of medicines have caused me great surprise. In the November number (p. 331) he says: "In searching histories of medicine for some indications that previous medical writers had perceived the bearing of the general law of therapeutics which is here stated, I have not been able to discover much to the purpose." He then quotes an interesting passage from Boerhaave, and proceeds: "It seems curious that this statement of the double and contrary action of remedies—of paramount importance in its application to treatment—should have dropped out of medical literature until it was partially revived, in what appears to me so incomplete a form, by Hahnemann, nearly a hundred years later."

Had the late accomplished editor of the *Practitioner*—Dr. Anstie—been living, what would he have said to this assertion, after the careful historical sketch he himself gave of the doctrine of stimulus and recoil in the introduction to his work on Stimulants and Narcotics?[1] The truth is that although Boerhaave

[1] *See British Medical Journal*, April 29, 1871, p. 439.

had a glimpse of this law, and although Hahnemann saw it, not imperfectly, but with an exceedingly clear and distinct vision, yet the influence of the writings of these authors on the development of the doctrine was very small in comparison with the influence of other writers. Hahnemann has of course formed a sect or school, and the influence of his writings with respect to the double action of medicines, as well as in other respects, has been paramount with his followers; but the influence which his views produced on general medical literature was not great. The roots of the doctrine of the double action of medicines are to be found in the obscure writings of Paracelsus and Van Helmont; but it did not begin to assume definite form until Glisson laid the bases of modern solidism by calling attention to the importance of living fibres, which he endowed with a special force denominated *irritability*. According to Glisson there were different degrees of irritability, the moderate, the sluggish, and the violent. The former of these alone constituted health, and the standard according to which the deficient or redundant degrees must be estimated. Glisson then proceeds: "Irritabilitas deficiens vocatur stupor sive torpor, et ignaviæ fibrarum author est. Irritabilitas nimis acuta caret proprio nomine; sed cognominari potest irrequieta, sive pruriens. *Irrequieta*, quod fibras ad inquietudinem disponat; *pruriens*, quod quasi ambiat et aucupetur movendi ansam."[1] From this passage it may be seen that Glisson generalised all diseases into those of excess or deficiency of the irritability of the living fibres; the former of which he regarded as a restless or uneasy condition, and the latter as a condition of stupor or of torpor. He did not generalise the exciting causes of disease; but gave a simple enumeration of them. Amongst the causes which give rise to excess of irritability he mentions inflammation; and amongst those which give rise to deficiency of irritability he mentions narcotics. After a time inflammation came to be regarded as the type of those diseased conditions which result from excess, and narcosis as the type of those which result from deficiency of irritability. But, as the late Dr. Anstie[2] very justly pointed out, Van Helmont had already said that an

[1] *Tractatus de Ventriculo et Intestinis*, p. 199, Amstelodami, 1677.

[2] *Stimulants and Narcotics*, by F. E. Anstie, M.D., Lond., 1864, p. 33, *et seq.*

inflamed part "is as if a sharp thorn wounded a nervous tissue;" and it was in further development of this conception that the exciting causes of inflammation and all other signs of increased vital activity came to be generalised under the term stimulants —a word derived from the Latin *stimulus*, which means a goad for driving cattle—while the agents which lower vital activity were generalised under the term narcotics or sedatives. According to Broussais[1] the school of Winter were the first among pathologists to use the word "stimulant" in regard to vital actions. So far we have only attained to the conceptions that some diseases are characterised by excess, and others by deficiency of vital action; but we have not yet got to the conception that the latter condition is frequently an indirect result of the former. It was reserved for Hoffmann to initiate the latter conception. Hoffmann regarded disease as a disturbance of the due proportion and order of the motions in solids and fluids; but the alterations in the movements of the solids played a predominant part in his system. Such diseases as inflammation and fever were caused by excess of motion giving rise to *spasm;* and diseases like fainting, prostration, and chronic and hereditary diseases by deficiency of motion giving rise to *atony.* But what most concerns us at present is Hoffmann's assertion that diseases which begin with spasm generally end in atony. "Quo vehementior itaque est spasmus," says Hoffmann, "et quo diutius partem affligit eo major atonia, imbecillitas ac virium resolutio relinquitur."[2] With regard to Hoffmann's treatment I may be permitted to quote language used by myself on a previous occasion: "His classification of remedies," I said, "is very simple. In diseases, either the motion or the matter moved may be at fault. As we have already seen, the motion may be excessive, giving rise to spasm; or deficient, causing atony. The diseases which arise from spasm must be met by sedatives, and from atony by excitants or roborants. The matter of the body may be at fault either in its quality or quantity. Imperfections of quality must be corrected by alterants, and of quantity by evacuants."[3] In these conceptions

[1] *Stimulants and Narcotics*, p. 39.—Foot note.

[2] *Opera Omnia*, tom. i. p. 169, Geneva, 1748.

[3] *The Practitioner*, vol. x. p. 217, 1873; *The Geometrical Method in Medicine*, part ii.

of Hoffmann we have the germs of all subsequent systems of therapeutics.

The ideas of Glisson with regard to irritability were now revived and greatly elaborated by Haller, who supposed that the body was endowed with two fundamental properties: *irritability*, or *vis insita*, and *sensibility*, or *vis nervosa*, and these properties were supposed to be acted upon by two sets of agents, those which acted upon the irritability being alone called *stimulants*. It was at this point that Cullen appeared on the scene. He was a disciple of Boerhaave, but he soon forsook the eclecticism and humoralism of his master for the more consistent system of Hoffmann. Cullen's theory of fever was nothing but Hoffmann's spasm and atony, modified in accordance with the more developed conceptions of his age in other departments of science. Cullen perceived that there was no essential difference between the agents which excite the sensibility and those which excite the irritability; hence he generalised these agents and called both *stimulants*. "The idea annexed to the term stimulant," says Cullen, "is that of a power suited only to excite the action of moving fibres; but I am here to consider stimulants more generally, as exciting the motion of the living principle, whether producing sensation or as producing the action of moving fibres." [1] But the predominance which was accorded to the nervous system in the medical theories of Cullen, and subsequently in those of Brown, had the effect of transferring the term stimulant almost exclusively to the agents which excite nervous tissue to action; although it was originally almost entirely restricted to the agents which act upon muscular fibre. "The peculiar effects of substances in general," says Cullen, "or of those substances in particular which we call medicines, when applied to the human body, depend upon their action upon its *sentient* and *irritable* parts;" [2] and a little further on he adds, "Upon the whole, it is sufficiently probable that the peculiar action of medicines depends upon the sensibility and irritability of the human body; or, in other words, that it universally depends upon motions excited and propagated in the nervous system." Haller regarded the *vis nervosa* and the *vis insita* as

[1] Cullen's *Materia Medica*, vol. ii. p. 109.

[2] *Materia Medica*, by William Cullen, M.D., vol. i. p. 48, Dublin, 1789.

co-ordinate principles; but this passage, and many others which might be quoted, show that Cullen relegated the irritability to a purely subordinate position. We have seen that he had generalised both the agents which excite muscular fibres, and those which excite nervous tissues to increased activity, and called them stimulants; but he could not make up his mind to reduce the dualism of Haller to a unity by declaring the existence of one principle only, but the subordinate position assigned to the irritability effected this reduction practically; although Cullen did not enunciate the generalisation as a distinct proposition. It may be expected, therefore, that his fundamental conception with regard to the action of external agents on the nervous system will afford us the key to his pathology and therapeutics. "The nervous power," says he, "in the whole as well as in the several parts of the nervous system, and particularly in the brain, is at different times in different degrees of mobility and force. To these different states I beg leave to apply the terms of *excitement* and *collapse*. To that state in which the mobility and force are sufficient for the exercise of the functions, or when these states are in any way preternaturally increased, I give the name of *excitement*; and to that state in which the mobility and force are not sufficient for the ordinary exercise of the functions, or when they are diminished from the state in which they had been before, I give the name of *collapse*."[1] With regard to the agents which increase or diminish the nervous power, Cullen says: "There are substances which, applied to the nerves, have a power of increasing or diminishing the mobility of the fluid contained in them. The former we call *stimulants*, the latter *sedatives*."[2] It is very curious to notice that in his classification of remedies the stimulants were a very unimportant and subordinate group, including only such agents as we should now call aromatics, resins, and balsams, and he advanced no theory of their action beyond the statement that they increased the mobility of the fluid contained in the nerves. The sedatives included opium and hyoscyamus, and the other agents which we should call

[1] *First Lines of the Practice of Physic*, by W. Cullen, M.D., vol. iv. p. 130 Edinb., 1791.

[2] *Materia Medica*, by W. Cullen, M.D., vol. ii. p. 110, Dublin, 1789.

narcotics; as well as alcohol and wine, or the agents which we now regard as the type of stimulants. Cullen's theory of the action of sedatives is the most remarkable doctrine in the whole of his therapeutics. Not only was he himself quite conversant with the primary stimulant effect which the agents which he called sedatives produced, but this action was recognised by his contemporaries; since Cullen mentions a hypothesis advanced by others to account for the double action of narcotics. "Some have imagined," says Cullen, "that in the same narcotic substance there is a stimulant as well as a sedative matter."[1] The author then rejects this supposition and proceeds:—"To explain therefore the stimulant effects that often appear from the exhibition of narcotics, it seems necessary to assign some other cause than the direct stimulant power of the substance applied, and it appears to be that *resistance* and consequent activity which the animal economy is suited to oppose to every application that has a tendency to hurt it."[2] He then remarks that "this power is well known in the schools of physic, under the title of the Vis Conservatrix et Medicatrix Naturæ, which, however difficult to explain, must as a general law of the animal economy be admitted as a matter of fact." Cullen was quite aware of the exceedingly slender distinction which divided his class of sedatives from his stimulants; but being probably dominated by the system of Hoffmann, he preferred to think that the sedatives by their own nature always tended to depress the nervous power, and he accordingly attributed the primary stimulant action to the reaction of the organism itself. But the fact that he regarded sedatives as "*indirect stimulants*" sufficiently shows that he fully recognised the close similarity between the effects of the two classes of agents. It is curious to notice how in the history of medical opinion, as well as in the history of other opinions, the same doctrines crop up generation after generation; and probably no one will be more surprised than Dr. Rabagliati to find how closely similar his own theory of the primary and secondary action of certain agents of which pressure and cold may be taken as the type, is to Cullen's theory of sedatives.

"The contrariety between the effects of a large and small amount of pressure," says Dr. Rabagliati, "is due to the

[1] *Materia Medica*, vol. ii. p. 185. [2] *Ibid.*

immediate occurrence of reaction; pressure is essentially a lowering of vitality, and, if carried far enough, may actually destroy functional activity. But when it is carried so far as to lower activity without destroying it, then, in accordance with law C., reaction is set up which induces for the time being heightened activity."[1]

Before bringing these remarks to a close I will quote an exceedingly important passage from Cullen's writings, which shows that he was thoroughly impressed with the contrariety of the primary and secondary efforts which may be evoked from the organism at different times by the same agent. Speaking of the causes of fatigue he says: "We may, I believe, find it in this, that such is the constitution of the nervous system, that every unusual degree of excitement is followed by a proportional degree of collapse. I leave you," he proceeds, "to consider this explanation at your leisure. It is with the fact that we are especially concerned, with the theory much less; but the question applies to an important consideration in pathology, How is the debility of fevers occasioned? and how is it continued?" In answering this question, Cullen thinks that in the case of fevers the contagion acts as a sedative, and, in accordance with his theory of sedative action, the debility is the direct result of the contagion, the primary stimulant action being caused by the reaction of the organism. But, according to the author, this explanation will not apply to the debility which succeeds inflammatory fevers; and there are cases of fever caused by contagion in which the first symptoms of debility have passed away; but under some circumstances there may be a repetition of the paroxysm which cannot be attributed to the original contagion. With regard to these cases Cullen concludes:—"If we are to admit of any such explanation in the case of debility of fever, it must be the same as in the case of debility induced by exercise—*that the repeated excitements do at length wear out the vigour of the system.*"[2]

This paper is more than sufficiently lengthy already, but, with the Editor's permission, I shall trace the history of this important doctrine from the time of Cullen to the present time in a future communication.

[1] *Practitioner*, Nov., p. 332.

[2] Thomson's *Life of Cullen*, vol. i. p. 372 *et seq.*, Edinb., 1827.

Reviews.

A Guide to Therapeutics. By Robert Farquharson, M.D., Edin., F.R.C.P. Lond., Lecturer on Materia Medica at St. Mary's Hospital Medical School, &c. 8vo. pp. 302. London: Smith, Elder, and Co.

In this work the author omits all pharmacy, and gives only the physiological action and therapeutical uses of the remedies of which he treats. The arrangement of Garrod has been followed in regard to the order of the drugs; but while many persons who learned therapeutics before the physiological action of remedies was taught to students find it difficult to discover the bearing of physiological action on therapeutic employment from ordinary text-books, Dr. Farquharson has most ingeniously shown it by printing the two in parallel columns and corresponding paragraphs, so that by running the eye down the left-hand side of a page we get the physiological actions of the drug, and on the right-hand the therapeutical uses, while by running it straight across the page we at once perceive the relations of the one to the other. On this account the work is likely to be useful not only to students preparing for their examinations, but to those medical men also who are well acquainted with larger works on the same subject, but experience the difficulty already mentioned of seeing the relation between the actions and uses of remedies.

Grundriss der Materia Medica für practische Aerzte und Studirende, mit besonderer Rücksichtnahme auf der Pharmacopœa Germanica. Bearbeitet von Dr. Hermann Köhler, Professor an der Universität Halle. Leipzig: Veit and Co. 1878.

Some time ago we had occasion to review Professor Köhler's admirable "Handbuch der Physiologischen Therapeutik" (*Practitioner*, vol. xvi., p. 306), and the present work is one which, like its predecessor, we can cordially recommend. It is much smaller than the "Handbuch," and does not contain the literature which makes the other so valuable to workers in pharmacology; but it is well adapted for practitioners and students who wish a brief

as well as accurate account of the remedies contained in the German Pharmacopœa. The omissions which we noticed in the "Handbuch" have been filled up in the present work, and the author has been careful to incorporate all the pharmacological work done since the appearance of his former work, so that the present one is useful to those who possess the other, although it will be still more so to those who do not.

On Alcoholism: The Various forms of Alcoholic Delirium and their Treatment. By Dr. V. Magnan. Translated by W. S. Greenfield. London: Lewis.

It is seldom that a book falls into the hands of a reviewer which can be spoken of in terms of such unqualified praise as that of Dr. Magnan. His observations are precise, his records of cases are fluently and effectively written, and the principles which he propounds are advanced and attractive. It would be impossible to offer in our pages anything like a satisfactory summary of Dr. Magnan's volume, and we can only speak briefly of some of its prominent features. The author's experience has enabled him to record some most interesting observations on the actions of absinthe, especially with regard to the production of convulsions by the excessive use of that substance. It seems that these convulsive seizures are sometimes attended by loss of consciousness and sometimes not—an exceedingly interesting point as showing the probability that absinthe acts mainly on centres less highly evolved than those affected by alcoholic excesses. Our knowledge of the states produced by chronic alcoholism as it occurs in this country leads us to hesitate in accepting Dr. Magnan's division of them into two definite classes. "Chronic intoxication," says he, "in its ultimate evolution follows two different paths—the one ending in Dementia and the other in general Paralysis." The records of cases in our large asylums show numerous instances of another class of alcoholics who are often slightly if at all demented, and in whom the leading features are those of mania with delusions of suspicion, hallucinations of sight and hearing, and decidedly aggressive tendencies, all of which symptoms are apt to be paroxysmal in their occurrence. Patients of this class may continue for years manifesting no other symptoms and making little or no progress towards dementia. Some of Dr. Magnan's cases, notably Case XXII., show that this form is well known to the author, though he seems to have ignored it in his classification.

Dr. Magnan's remarks on the pathology of chronic alcoholism are very well timed, and true to the most advanced views on Cerebral Physiology. Dr. Greenfield deserves the thanks of the medical profession for having made such an admirable treatise accessible to all classes of medical readers.

Quain's Elements of Anatomy. Eighth Edition. Edited by William Sharpey, M.D., LL.D., F.R.SS. L. and E., Emeritus Professor of Anatomy and Physiology in University College, London; Allen Thomson, M.D., LL.D., F.R.SS. L. and E., Professor of Anatomy in the University of Glasgow, and Edward Albert Schäfer, Assistant Professor of Physiology in University College, London. In two volumes. Illustrated by upwards of 950 Engravings on Wood. London: Longmans, Green, and Co., 1877.

On reading this new edition of Quain's "Anatomy" we are glad to find that it maintains its place as the best and most complete textbook of anatomy in the English language, and is, on the whole, one of which British anatomists may be proud. So rapid is the progress of anatomical science and methods of teaching, that though little more than nine years have elapsed since the appearance of the seventh edition, it is already antiquated, and great changes are now apparent in the eighth edition now given to the world. The alterations begin in the staff of editors, Dr. Cleland of Galway being succeeded by Mr. Schäfer of University College. Associated with Dr. Thomson in editing the first volume has been Mr. D. N. Knox, of Glasgow, assisted in the description of the blood-vessels by Mr. H. Clarke, and by Dr. Gowers in that of the nerves. Most of the second volume has been produced under the care of Dr. Sharpey and Mr. Schäfer. This division of labour has enabled very recent information to be given. Indeed there are excellent digests of memoirs which only appeared when part at least of the book must have been in the press. At the same time the old adage that too many cooks spoil the broth is partially exemplified in a certain want of unity in the writing, and in an excessive number of *lapsus calami*, especially in Volume I., indicating a want of experienced supervision.

The first volume contains the Descriptive Anatomy of the Bones, Joints, Nerves, Muscles, and Vessels, and incorporated with the account of the latter two is the substance of the chapter on Surgical Anatomy which appeared in former editions. Dr. Thomson's well-known caution has overreached itself in the account of the bones. Instead of using Morphology and Homology as the foundations of an interesting and easily remembered description, all references to those subjects are banished to separate sections, where the views of different authorities are pitted against each other, while the editor commits himself to nothing. Any mention of the internal structure and arrangement of the cancellated tissue of the various bones is ignored, and for such information the practical surgeon must consult Wagstaffe's manual. The illustrations to this chapter are the

old flat woodcuts which have tantalised generations of students. In the chapter on the Muscles there are some very interesting sections on their morphology compiled from the writings of Huxley, Mivart, &c., &c.

The classic chapter on General Anatomy by Dr. Sharpey, extending to 238 pages, with which the second volume commences, was printed off separately in 1874, and is now well-known. Pettigrew's account of the arrangement of the muscular fibres of the heart has been abandoned, and the description given is founded on an entirely fresh investigation undertaken with the co-operation of Mr. F. J. Davies.

The illustrations throughout the second volume are splendid, and the chapters on the Heart, Respiratory, Vocal, Digestive, and Urinary Organs, Brain, and Spinal Cord are all much improved. Still there are shortcomings, among which we may mention the very imperfect account of the position of the stomach, no mention being made of Luschka. A very serious omission is the want of any information to aid in localising the position of the fissures and convolutions of the brain upon the surface of the skull. The chapters on the Organs of the Senses and the Ovaries deserve special notice. In the latter, and in the chapter on Development, the researches of Dr. James Doulis on the development of the ova and structure of the ovary, published in the Edinburgh Philosophical Transactions for 1875, have been abstracted.

The most valuable novelty in the volume is the concluding chapter, occupying 154 pages, from the pen of Dr. Allan Thomson, on Embryology, or Development of the Fœtus and its Organs, including the Formation of the Membranes and Placenta. As might be expected, it is a remarkably clear and instructive exposition, and it brings into one place the special history of the development of the several organs of the body which in previous editions was distributed throughout the work. Each volume is furnished with a table of contents and a copious index, with an accompanying explanation of the derivation of terms.

Clinic of the Month.

On simple Chronic Ulcer of the Stomach.—Prof. Sebert of Zürich founds his conclusions on an analysis of 252 cases observed at the clinical and poly-clinical hospitals. One hundred and four of these cases had been noted in detail; in thirty-three the bodies had been examined; the remainder were utilised for statistics. They comprised chiefly that form of gastric ulcer which ensues on local congestion, followed by a limited degree of interruption to circulation of the blood and by the formation of an ulcer. However, superficial ulcerations, erosions of the mucous membrane, aphthous ulcers, and simple inflammatory ulcerations are also considered. The frequency of gastric ulcer varies in different countries, and in different parts of the same country. Taken on the whole, we find four per cent. of the autopsies connected with gastric ulcer. The cause of the ulcer sometimes escapes discovery; at other times it can be traced to general anæmia or nervous depression, possibly of the vaso-motor nerves. Hence its frequency in cases of chlorosis. The chief clinical forms of the simple ulcer are:—(*a*) the acute, with perforation of the stomach and extensive peritonitis, terminating in death; (*b*) the hæmorrhagic form; (*c*) the scorbutic—a variety of the hæmorrhagic; (*d*) the dyspeptic, resembling gastric catarrh, but more painful; (*e*) the gastralgic, distinguished by paroxysms of pain; (*f*) a form in which vomiting is the principal symptom; (*g*) the cachectic form: this may resemble cancer, and we find in these often narrowing of the pylorus and dilatation of the stomach. In Professor Sebert's memoir the chief symptomatic groups are described and analysed with great care. The following are some of his conclusions:—Vomiting of blood, either pure or under the form of melæna, was observed in four-fifths of the cases, and was the cause of death in three per cent. of the hospital cases. The mean duration of the disease is from three to five years, with alternations of improvement and relapse. It is sometimes latent to such an extent that cicatrisation and a cure may ensue without any very apparent disturbance of the health. Death seldom occurs during the first year; it ensues more frequently in the second and third years

of the disease, when the latter is progressive. Relapses are not rare. When any considerable time separates the second attack from the first the prognosis is favourable. External gastric fistula is not dangerous; but those communicating with the lungs or the colon are frequently, if not always, fatal. The treatment of ulcer of the stomach must, in the main, consist of measures calculated to improve the general health. The best effects which the author has obtained were from a milk diet. We must be very careful not to pass too abruptly to a more substantial regimen, and to continue our watchfulness for a long time after apparent cure. Constipation will require opening remedies, especially aloes. When the pain is not alleviated by attention to diet, recourse must be had to opiates by the mouth or in the form of morphine injections as alterants; the most benefit has been derived from subnitrate of bismuth and nitrate of silver. The use of any medicine not absolutely necessary must be avoided. Vomiting of blood is met by astringents and ice. (*Medical Examiner*, August 2nd, 1877.)

On Diphtheria, Croup, and Tracheotomy.—The following provisional conclusions have been drawn up by M. Revilliod, professor of clinical medicine at the University of Geneva. 1. Diphtheria is an acute specific disease, characterised anatomically by false membranes in the respiratory passages, and attended by symptoms which are either slight or severe, the former connected with the local lesion only, the latter depending on a general poisoning of the blood. 2. The distinction into croup and diphtheria, based on pathological anatomy, is not supported by observations made at the bedside of the patient. That both forms depend on the same principle is shown by the facts: (*a*) that they are connected by a number of intermediate degrees of local lesion and general symptoms; (*b*) that they are developed during the course of the same epidemic, under the influence of the same contagion, and oftentimes succeed each other immediately in the same individual. 3. Like all other infectious diseases, diphtheria, which is endemic in cities, is epidemic in rural districts. Deaths from diphtheria are more frequent in towns than in the country—in hospitals than in private residences—in large than in small establishments. The mortality as well as the violence of the contagious principle varies at different times and in different countries. Diphtheria is distinguished from other virulent and miasmatic affections by the special tendency which some families have to contract the disease, and in virtue of which we often find brothers and sisters successively attacked under conditions of time and place that exclude the hypothesis of contagion. 4. There is no specific for diphtheria; the treatment must vary according to the forms

and different manifestations of the disease. Cases of croup in the third period can be treated successfully by tracheotomy alone; on this supreme resource we must fall back, whatever conditions of age, constitution, or complications may present themselves. It should save two-fifths of the patients. The use of chloroform should be avoided as of little avail, and often pernicious. The mixed method of tracheotomy, as it has been called, is preferable to either a rapid or slow operation, and the conditions of its success depend on careful after-treatment, as well as on the intensity of the primary diphtheritic infection. One of the most frequent causes of death after tracheotomy is a disturbance of pulmonary innervation, similar to that which occurs in other systems, and which manifests itself by expiratory dyspnœa, tracheal anæsthesia, and nutritive disorder of the lungs. (*Medical Examiner*, August, 1877.)

On the Use of Ozonic Ether and Lard in Scarlatina.—Dr. Day of Geelong has used, in a considerable number of scarlatinal cases, a solution of peroxide of hydrogen in ether, mixed with lard, in the proportion of one of the former to eight of the latter. He has also used, when throat affections were at all severe, a gargle consisting of two drachms of the ethereal solution of peroxide of hydrogen to eight ounces of water. He alleges regarding his plan of treatment—first, that the peroxide being a powerful oxidiser, and therefore disinfectant, in a concentrated form, destroys the poison germs before they are thrown off from the body, so that the patient "is enabled to breathe a pure atmosphere, instead of, as under ordinary circumstances, an atmosphere contaminated by the poisonous emanations from his own body;" secondly, that, in consequence of the rapidity with which the scarlatinal poison is destroyed, desquamation of the cuticle seldom occurs; thirdly, that it places in the hands of the practitioner a positive means of arresting the spread of the disease.

The notes of fifty-five cases treated on this plan by Dr. Day, between April, 1873, and April, 1875, were laid before the Council of the City of Melbourne, as the Local Board of Health, when they were ordered to be printed, and copies forwarded to the several local boards of health in the colony. The notes show that fifty-three of these cases recovered; but the result was not mentioned in two cases, and we can therefore only speak as to fifty-three. This of itself, although good *primâ facie* evidence of its utility, as no other treatment was adopted, is not sufficient, as it is well known that the disease prevails in a very mild character for lengthened periods, and then assumes, for a longer or shorter time, a malignant form. That the cases were very mild is rendered probable by the comparative rarity of sore

throat. The most important part of the evidence is the extreme rarity with which other children living in the same houses became affected with the disease; indeed with the exception of two instances, in which the inunction was imperfectly carried out, it was confined to the person first affected. Instances are mentioned of children being attacked in the one school where there were ten boarders and twenty-five day-scholars, in another where there were six other boarders and about sixty day-scholars, without any infection of the other children. The exceptions almost prove as much, because in one case the inunctions were continued for five days only, and four other children became infected a few days after they were left off; and in another the servants had a slight attack and did not use the peroxide, where two children and an adult contracted the disease.

These statements are such as to render a trial of the plan advisable, not only for the sake of the patients, but of the public. There is no doubt that peroxide of hydrogen is a very unstable compound, which readily parts with one atom of its oxygen, and also liberates with some degree of violence the oxygen in the oxides of certain metals, and thus reduces them to a metallic state. The ethereal solution has a certain amount of stability, owing to the affinity of ether for the peroxide, but nevertheless we are not prepared to admit all the powers and virtues claimed for it by Dr. Day. He has also, as he believes, extended its usefulness to the prevention of pyæmia, erysipelas, and puerperal fever in hospital practice, by having the walls painted and the floors coated with paraffin and then polished with turpentine; thus preventing the use of soap, an alkaline compound for cleaning the floors and walls. (*British Medical Journal*, December 8, 1877.)

Artificial Anæmia as a Mode of Treatment for Diseases of the Limbs.—A new application is suggested for Esmarch's elastic bandage, namely, as an anæsthetic and curative agent in painful inflammatory affections of the extremities. Dr. Bernhard Cohn of Steglitz relates (*Berlin Klin. Wochenschrift*, October 29, 1877), two cases in which the induction of artificial anæmia by the bandage was followed by great relief—a case of phlegmonous inflammation of the foot in a man of sixty-three, and one of simple œdematous inflammation of the forearm in a maid-servant; and he gives the details of a third case in which a practical cure resulted from Esmarch's method after all other modes of treatment had been exhausted. The patient, a boy of three-and-a-half years, had white swelling of the left knee joint of eighteen months' standing, with considerable enlargement of the condyles of the femur and thickening of the tissues around the patella and the head of the tibia.

There was great sensitiveness of the parts to pressure, movement was impaired, and walking only possible for a step or two, with lowered pelvis, and with the tips of the toes only reaching the ground on the left side. After a few weeks' daily application of the bandage for from fifteen to sixty minutes, the improvement was so great that the limb could be moved in all directions or handled without pain, the entire sole of the left foot could be brought to the ground in walking, and the gait was even on the two sides—in fact, all that was left of the former affection was a little swelling and limitation in the movement of the joint. Dr. Cohn, in his remarks on the cases, declares that in practice the idea that the increase of blood in the capillaries, which follows the removal of the bandage, will entirely undo the effect of the previous anæmia, is not sustained. He considers that the bandage acts mainly by relieving the congestion of the inflamed part, and perhaps by improving the conditions of diffusion between the tissues and the blood-vessels. He recommends an elastic band, one inch and a half wide, encircling the limb so that each turn overlaps the one below, and finished off with five or eight turns completely covering each other. He thinks that the bandage may be allowed to remain on the limb longer than we might, *a priori*, think justifiable, and that there is less danger of gangrene if both arteries and veins are completely compressed, than if the compression be imperfect, so as to close the veins and hinder the escape of blood, while it is still allowed to enter by the arteries. In the latter case, œdema, with enormous rise in the blood-pressure, must be the result. To avoid pain as much as possible, the final turns must not be tighter than absolutely necessary to stop the circulation. The questions, "How often can and ought the constriction to be removed?" and "Is it better to use single *long* compressions or short frequent ones?" require further experience to answer them satisfactorily. (*Medical Times and Gazette*, December 1, 1877.)

Treatment of Serous Effusions by Limitation of Fluid.—Dr. Cheadle remarks that to pour fluid into the body, freely, at the same time that we are endeavouring to draw it out by all the means in our power seems illogical. The fluid drawn off from the blood by active measures will be replaced from the readiest source, the natural channel of supply, the absorbents of the alimentary canal, whose proper function it is to furnish it, if they have enough to draw upon. It is surely, he remarks, *prima facie* probable that if we lessen the means of supply through the gastro-intestinal vessels, the endosmotic drain upon the other means of supply, the effused fluid set up by the removal of fluid from the blood by purges and diuretics, will be intensified and prolonged, and thus rendered effectual when other-

wise it would hardly have been called into action. What the blood fails to receive from the easier and natural source it will drink up from the abnormal source, and the equilibrium of the blood density be restored by the return into it of fluid previously forced out of it by the inflammatory process or by mechanical pressure, when mechanical pressure is lessened and density increased by the action of purges and diuretics. This theory seemed to him, in its general principle, so reasonable that he determined to put it in practice at the first convenient opportunity. He has been able to apply it in five cases ; two of these were cases of cardiac dropsy, one of ascites, and two of ordinary pleuritic effusion. (*Lancet*, November 24th.)

Treatment of Epilepsy by Bromide of Zinc.—Experiments have been going on for some time, in M. Charcot's wards at the Salpêtrière Hospital, with bromide of zinc as a remedy for epilepsy. It can be administered either in the form of pills or as a syrup. The pills contain each three-quarters of a grain of bromide of zinc. Commencing with one pill daily, the dose may be increased to twenty-five grains, increasing the quantity of bromide contained in each pill. The drug can be given in syrup according to the following formula:—Bromide of zinc 15 grammes, syrup of bitter orange peel 150 ; four, five, or six teaspoonfuls to be taken in the course of the day. The results obtained from the administration of these pills have been satisfactory. (*British Medical Journal*, November 24th.)

Sulphate of Atropine in Pathological Sweats.—At the meeting of the Paris Academy of Medicine on November 6th, M. Vulpian called attention to the want of efficacy in all the means hitherto employed to combat pathological sweats, more especially those from which phthisical patients suffer. He has found that sulphate of atropine, given in pills containing half a milligramme (three four-hundredths of a grain), is a sure preventive of these nocturnal sweats. It generally suffices to administer one or two of these pills, but in certain cases the dose must be increased to four pills. The cases on which M. Vulpian founded his thesis all occurred in his own wards, and he believes that he is the first to have introduced this plan into France. (*British Medical Journal*, November 24th.)

Influence of Iron mixed with Food on the Blood.—Nasse fed a dog weighing about 17⅔ pounds, during eighty-seven days, with bread and potatoes, giving at the same time, for twenty-five days, 15½ grains of lactate of iron daily, and for the remaining sixty-two days 18½ grains of oxide of iron each day ; the dose in each case being mixed with about ⅔ths of an ounce of fat. The weight of the animal increased by more than

two pounds. The specific gravity of the blood rose from 1052 to 1060·8, that of the serum remained nearly unchanged. The amount of iron in the blood increased from 0·477 per mille to 0·755. In seven other dogs out of eight subjected to experiment, feeding with various preparations of iron was followed by an increase of the solid constituents and of the specific gravity of the blood; the latter being 3·02 higher than before, indicating an addition of 7·6 per mille to the former. The increase of the solid constitutents depended solely on that of the blood-corpuscles. The amount of iron in the blood rose regularly. In conclusion, the author expresses his belief that the administration of iron mixed with fat is productive of the most fruitful results; and he recommends the use of fat food containing iron for anæmic patients. (*British Medical Journal*, November 24th, 1877.)

Determination of the Sex before Birth.—Will it be a boy or a girl?—is a question often debated in domestic life, and of great interest to many important personages. The question does not admit of being solved with mathematical certainty, but medical science enables us to obtain a very close approximation. In the first place, experience has established the general fact that the heart beats quicker in the female than in the male infant before birth. This fact is ascertained by means of the stethoscope. The average pulse of the female infant before birth is 150; that of the male infant 120. It is also known that the number of pulsations bears an inverse ratio to the size of the unborn child. It may be objected that the influence on the fœtus of the mother's circulation is not taken into account here. It is assuredly a factor which should not be neglected. The relation is, however, easily established if we divide the fœtal pulse by the maternal pulse. This matter was recently tested at Venice in a case which excited very great interest. Two sisters, very similar in general health and bodily formation, became *enceinte* at the same time. The sexes of the children were destined, for certain reasons, to exercise an important influence on valuable interests at stake. In the case of the elder sister the fœtal pulse marked 120; in the younger, 145; and according to previously received ideas the elder sister should have given birth to a boy. But her pulse at the wrist marked 65, while that of the younger sister marked 95. The relations, taking into account the influence of maternal pulse, were, therefore, as $120 \div 65$ to $145 \div 95$, or as 1·84 to 1·47. The inference drawn was that the elder sister would give birth to a girl, the younger to a boy. Their *accouchements* took place on the same day, and the events confirmed the inferences. (*Med. Examiner*, No. 14, vol. ii.)

The Treatment of Pleuritic Effusion.—Dr. Clifford Allbutt divides pleurisies into (1) dry pleurisies, into which the tuberculum may be included; (2) acute effusive pleurisies, in which rheumatica is included; (3) quiet effusive pleurisies in the effusive stage; (4) empyemata; and (5) pleuritic dropsy. In regard to acute effusive pleurisies, the treatment he adopts is to apply leeches freely at the outset, and as soon as the bleeding has ceased binds the affected side down by strapping. He gives a mild saline purgative at the beginning, followed by the use of mercury and chalk, combined with Dover's powder in fractional doses. Between these powders he gives a mixture containing acetate of potash and large doses of liquor ammoniæ acetatis. He finds the fibrinous effusion which issues in these cases almost always subsides when it has reached its height, and he is never in haste to interfere by operation. But if the patient be uneasy, or if the entry of blood to the right heart be injured, he does not hesitate to tap at once. When all fever is passed the use of a blister is recommended. In the chronic stage, when dulness remains, he employs a combination of the bi-chloride of mercury with iodide of potassium and bark or iron, which may be given fearlessly for weeks. In cases of quiet effusive pleurisy, where the quantity of fluid is often very large, he advises the patient gentle saline purgatives such as Hunyadi water and syrup of iodide of iron with digitalis; mercury he withholds, save as an occasional alterative. He does not strap the chest, as he prefers to be able to apply repeated blisters, stopping short of vesication. He believes it will be found better in the end to tap all cases where more than two pints of fluid are present. His experience of the operation in large serous effusion is very favourable. The chances against re-accumulation in cases of early operation are very moderate and even small, and unless pus be formed a third operation is, in his experience, quite rare. The aspirator, which is valuable in highly fibrinous effusion, is even undesirable in serous effusion. It is better, he thinks, to allow the lung to expand at its own pace, and not to draw off more fluid than the lung can at one time produce. With empyema operation of some kind is inevitable, and it should be done early. Lastly, with regard to pleural dropsy, puncture should be used only in cases of emergency. (*British Med. Journal*, Nov. 24, 1877.)

The Etiology of Typhoid Fever.—Dr. Charles Bouchard, Professor at the Faculty of Medicine, Paris, gives his conclusions on the etiology of typhoid fever in the following manner. 1. The contagious nature of typhoid fever, from man to man, viz., contact, innoculation, the ingestion of contagious matter through the lungs or alimentary canal, has not yet been demonstrated in

a perfectly satisfactory manner. M. Bouchard, therefore, invites the profession to furnish new and more accurately observed facts on the following points, viz. : the contagious power of the supposed media, especially the dejections in abdominal typhus; the period of the disease at which they commence to act; the period at which they lose their contagious property; the conditions which appear to favour the development and propagation of the contagious principles. 2. Independently of the solutions which may be given to the question of origin, M. Bouchard invites the communication of any documents which throw light on the media serving as vehicles of the poison, and on its mode of introduction into the human body. 3. Taking, for example, the air as a medium, it would be desirable to discuss such facts as tend to disprove the noxious influence of emanations from cesspools, drains, &c., and to collect statistics in sufficient number to permit of conclusions as to the influence exercised on the health of workmen by emanations from alleged foci, either during, after, or in the absence of epidemics. 4. Referring to water as a medium for the poison, M. Bouchard points out the advantage which would arise from the collection of any new facts illustrating the tendency of some partial epidemics to become localised round public wells, or to follow the course in which drinking water is distributed. Finally, it would be important to determine the influence of subterranean watercourses, the infiltrations which they receive, and the changes in level they undergo. (*Med. Examiner*, Aug. 2, 1877.)

On the Influence of Alcoholism on Mental Affections.—The following conclusions indicate the views entertained by Dr. Magnan on the question. The characters of alcoholism vary with the nature of the intoxicating fluid by which it has been produced. Alcohol alone does not cause epileptic fits. In cases where epilepsy occurs the attacks can be traced to some predisposition of the patient, or to other causes. The epileptiform attacks observed in some chronic cases depend less on drinking than on some previous disease of the nervous system.

1. Delirium tremens may be divided into three distinct forms, one symptomatic of some intercurrent affection; another of spontaneous origin, apyretic and mild; the third severe, and accompanied by fever.

2. Alcoholic dementia is different from every other form of madness; but it may either mask, hasten, or complicate some other chronic form; or it may imitate a peculiar kind of chronic and partial delirium. (*Med. Examiner*, August, 1877.)

The Sulphate of Cinchonidia and the Sulphate of Quinia.—Professor Love, of Atlanta, noting the difference in effect between the two remedies, says that there are some in

favour of cinchonidia. This latter has less action upon the nervous system; there is with it less cerebral fulness, less ringing in the ears, and less deafness and disturbance of vision or vertigo. As a cardiac sedative their action is about the same. Where quinine produces muscular prostration, coldness of the surface, and, in herculean doses, prostration and collapse, cinchonidia has not been noticed to have any different effect. As the result of extensive practice within a malarious district, where acute cases were apt to become chronic, quinine was not found so efficient as the preparations of bark containing other or all the alkaloids. In such cases he believes that cinchonidia will be found more effective than quinia. Indeed he has been in the habit of prescribing cinchonidia in the same doses, forms, and formulæ as quinia, except in some few acute cases where the active *explosive* power of the latter seemed to be indicated to meet a paroxysm; where, however, there were indications of a *siege* treatment rather than by *storm*, he thinks that an advantage other than pecuniary will be found in the sulphate of cinchonidia. (*Med. Examiner*, August, 1877.)

Liquor Phosphori Albumatus.—Mr. Urwick described this interesting preparation at the recent meeting of the British Pharmaceutical Conference. Following up some suggestions previously made by Mr. Williams, he succeeded in preparing a mixture containing phosphorus, alcohol, glycerine, albumen, and sugar, which kept unoxidised for a long time. He afterwards found that the addition of a minute quantity of oil of neroli, or of some one of several tinctures, removed the luminosity and disagreeable smell of the phosphorus, while apparently leaving its activity unimpaired. This remedy was exhibited at the meeting by Professor Attfield. The new preparation seems to promise very well. It is evidently prepared with great care, and will, we are inclined to think, be found applicable in all cases which require the administration of phosphorus. (*Lancet*, Oct. 27th, 1877.)

A Case of Poisoning by the Powder of Podophyllum Resin.—The following case is reported by Dr. David Webster. A chemist's assistant consulted Dr. Webster for inflammation of his eyes. On inquiry it was found that a few days previously he had been engaged for five hours in powdering, and was consequently much exposed to the dust of the resin of podophyllum. On the following day whilst washing his face he noticed that his eyes were red, and the skin about them discoloured, and by night-time the parts had become so painful as to prevent sleep.

When he presented himself at the hospital on Wednesday, all the parts which had been exposed to contact with the powder

were of a yellowish-red colour, but not swollen to an appreciable extent. The ocular conjunctivæ were much injected, the palpebral only slightly, the pupils small, the eyes painful and sensitive to light. Dr. Webster instilled a two-grain solution of sulphate of atropia four times at intervals of fifteen minutes before he succeeded in dilating the pupils. There were no signs of iritis, but there seemed to be a reflex spasm of the sphincter iridis. which caused it to resist the action of atropine. Dr. Webster gave the patient a two-grain solution of atropine to drop into each eye three times a day, and a borax wash for the whole affected surface, to be applied also three times a day. Five days after his eyes had resumed their normal appearance, except that the pupils were dilated, and the skin of the face and neck had lost its unnatural colour. A few small pustules were scattered over the chin and throat.

Dr. Webster stopped the atropine and directed him to continue the borax wash until the pustular eruption should have disappeared. The patient informed Dr. Webster that he knew of three other druggist's assistants who had been similarly affected from the contact of powdered resin of podophyllum. (*Lancet*, vol. xii. No. 23.)

Prevention of Epileptic Attacks by Subcutaneous Injections of Apomorphia.—Dr. Riegel of Cologne, in the course of his experiments with apomorphia, found that hypodermic injections of the drug prevented to a considerable extent the attacks of epilepsy in a case under his observation. This experience led Dr. Vallender, of Branweiler, to try the remedy in a desperate case of epilepsy, in which the attacks numbered from ten to fifteen in twenty-four hours. Each attack was preceded by an aura, consisting in a feeling of heat with sharp pain in the epigastric region. The feeling of heat spread from the stomach over the whole of the upper body, while the lower extremities were cold as far up as the knees. After a free interval of a few minutes the attack would follow: cry, loss of consciousness, clonic spasms. One-twelfth of a grain of apomorphia was injected subcutaneously during the aura, and instead of an attack, a state of syncope with unconsciousness followed, lasting for some minutes. Subsequently only one-twenty-fifth of a grain was used—enough to produce nausea, but not vomiting, and this quantity was injected as often as possible during the aura, sometimes as often as five times a day. It always prevented the attacks, or rendered them much shorter and milder; whereas, when it was not given, the paroxysm was as severe as before. The paroxysms gradually became less frequent and severe, and finally disappeared entirely. The injections were then discontinued, but as the attacks returned,

they were resumed after fourteen days, and continued for many weeks. During the eight weeks immediately preceding the writing of this article, there had just been the slightest sign of an attack. In a second case, the paroxysms lasted a long time, and were repeated several times a day. The aura consisted in a feeling of vertigo, and was separated by a very short, almost inappreciable interval from the attack. In this case it was of course very difficult to make the injection at the right time, *i.e.* during the aura. Nevertheless, the paroxysm was very much shortened after each injection. The treatment was continued several weeks and the attacks gradually became less frequent. During the last four weeks there had been no return of the attacks. In a third case, the aura preceded the fit by about a quarter of an hour, and consisted in a pricking feeling beginning in the toes and extending upward along with a feeling of constriction across the chest, and palpitation of the heart. Whenever an injection was made during the aura, the paroxysm was entirely prevented, but unfortunately the patient did not remain long enough under observation to enable Dr. Vallender to ascertain the influence of the treatment on the frequency of the attacks. In the first case, the disease had set in suddenly at the age of twenty, and had lasted two years; in the second, the patient had suffered from fits since her childhood, and her mother had been epileptic: in the third, the disease had existed for several years. (*Ibid.*, No. 348.)

Extracts from British and Foreign Journals.

Subcutaneous Injection of Blood in Cachexia.—M. Schmeltz observes that the hypodermic injection of defibrinated blood is a rational proceeding in cases where transfusion is indicated. It is well known, he remarks, that blood globules injected directly into the current of the circulation are for the most part rapidly destroyed and eliminated from the organism. It is therefore not to the morphological constituents of the blood that the good effects of transfusion can be exclusively attributed, but some action must be allowed to the elements which compose the serum materials that are eminently fitted for resorption. In accordance with these views he tried the experiment in one case of very serious cachexia, accompanied by almost complete atony of the digestive functions, in a man of sixty years of age. Eight injections of one drachm and a half were made into the skin of the arm. The swelling soon disappeared, improvement quickly took place, and ultimately the patient made a perfect recovery. (*Gazette Médicale de Strasbourg*, No. 6, 1877.)

Expectoration in Phthisis.—In an account of "Recent Progress in the Treatment of Thoracic Diseases," by Dr. Shaltuck, it is stated that M. Daremberg has recently written a thesis on this subject, in which he says that while formerly too much attention was devoted to the sputum, it is now passed over too lightly. Chemical analysis of phthisical sputum has shown that it may contain chlorides and phosphates in almost as large amount as the urine, and, if profuse, that it may thus materially assist in lowering the condition of the patient. Albumen and fat are also important constituents of phthisical sputum. The sputum of chronic bronchitis, on the other hand, contains these products in much less degree, and while a patient suffering from chronic bronchitis loses by expectoration about two per cent. of the nitrogenous substances necessary to his existence, a patient suffering from phthisis loses nearly three times as much. It is of great importance to diminish expectoration in phthisical patients, as it is to them a double source of exhaustion by the abundance of organic and mineral substances

which is expelled, and by the fatigue it occasions. M. Daremberg then speaks of the success which M. Bouchard has obtained in fulfilling this indication by the administration of creosote obtained from beech-tar. It may be given in doses of from one to three grains, and its use has always been followed by success, sometimes complete, after a longer or shorter time. It may be readily distinguished from the creosote of coal-tar by the use of collodion; fifteen parts of the coal-tar creosote and ten parts of collodion give a gelatinous mass, whilst beech-tar creosote mixes with the collodion and gives a clear solution. (*Boston Medical and Surgical Journal*, April 19th, 1877.)

Hydrotherapeutics in Acute Disease.—Dr. Sieffermann gives the therapeutical indications for hydrotherapeutical treatment in acute diseases. These, he says, may be divided for practical purposes into asthenic and sthenic. In asthenic affections, in which the vital force is considerably diminished, and where the power of reaction is very feeble, as in typhoid fever, cholera, some eruptive fevers, the nervous power must be conserved as far as possible, and hence prolonged and repeated cold baths should be avoided. The treatment should be commenced by slightly exciting measures, as by envelopment in the wet sheet or by cold lotions, and these must be given for the nervous system to recover its tone before using stronger excitants. The effect of water on the nervous system is either very exciting or calmative, according to the plan adopted. The diminution of the temperature of the blood is always a secondary effect, due either to exciting the powers of the nervous system, which then diminishes the rapidity of the current of blood, and strengthens the beats of the heart; or to calming the nervous system and augmenting the vital force as well as the vascular tone. *En resumé*, acute asthenic affections require but little cold water. It should be employed frequently, but only in small quantities, conditions that are quite fulfilled by the wet sheet, and if the prostration be very great, rapidly applied cold lotions are sufficient. In sthenic inflammatory affections a larger amount of heat may be abstracted at once by some of the various means in use. When the acute period has passed, and exsudates remain, prolonged application of wraps and local compresses should be adopted, which facilitates the absorption of the exuded matters. (*Gazette Médicale de Strasbourg*, No. 6, 1877.)

A Method of Measuring the Lower Extremities.—Dr. Richard O. Cowling, of Louisville, states that by the ordinary method of obtaining the comparative length of the lower extremities, it is difficult to get exact results. Even when every precaution is taken to guard against the obliquity of the pelvis (which is the chief source of error), an eighth or even a quarter

of an inch difference may escape detection. Such at least is the case when measurement is made between the spinous process of the ilium and the malleolus on each side. Neither of these presents a point, but a surface which, in persons well-clothed in flesh, occupies considerable area. When measurement is made from the umbilicus or episternal notch to the middle of the sole of each foot (Sayer's method), this difficulty is perhaps done away with. Dr. Cowling has, however, for several years past adopted another plan which is, he thinks, more convenient, and by which the liabilities to error (when a tape line alone is used) are reduced to a minimum. The plan is this: The patient lying on the floor or a table (a soft mattress will confuse any measurement), the parallelism of the iliac spines and the proper extension of the limbs being looked to, a point is taken on the umbilicus, and marked with ink, if necessary. Commencing at this point, the tape is carried in turn *around the sole of each foot and back again to the point of departure.* The difference between the two measurements thus obtained represents *twice* the amount of difference which exists in the length of the limbs. For instance, if the measurement thus obtained when the tape is carried around the right foot is fifty-four inches, and when carried around the left foot it is fifty-five inches, the difference in the length is half an inch. Of course care must be taken to carry the tape around corresponding portions of each foot, and in the same direction—from within, outward, or *vice versa*—on both sides. A great amount of swelling in the foot may also occasion error, but not to the extent it might be imagined. He thinks the method described will be found convenient and useful, either when employed alone or to verify results obtained by other plans. It has the advantage of indicating small differences, as these are multiplied. (*Med. Record,* No. 346.)

Atropine and Daturin.—A. Pöhl states that Plauta regarded these two alkaloids as chemically identical, because he believed their chemical composition to be the same as well as their reaction and physiological properties. This view was generally accepted, notwithstanding that Schroff, Lemaitre, Bouchardat, and others pointed out that there were differences not of unimportant character between the so-called belladonna preparations. Von Hager attributed the greater activity of English atropine to the presence of a large amount of impurity in the form of belladonnin. Erhardt, however, has shown that atropine and daturin do not agree in the form of their crystals; and Pöhl now adds that their optical properties are not identical, daturin rotating the plane of polarisation of a ray of light to the left, whilst atropine is optically inactive. Their reactions moreover are not

identical: atropine salts are precipitated by platinum chloride; those of daturin are not. The reverse obtains with picric acid, which only precipitates daturin salts. Hence Pöhl regards the two substances as quite distinct. (*Deutsche Zeitschrift f. prakt. Medecin*, Oct. 27, 1877.)

Treatment of Sprains by Massage.—Dr. Douglas Graham of Boston gives the results of two cases of sprained ankle treated by massage. 1. A young lady of good muscular vigour and firm tissues had sprained her ankle three times within two years. The last injury was naturally the most serious, the foot being turned violently inwards. For two or three weeks she was treated with rest, bandages, &c., and after that she got about on crutches, walking stiffly and with pain, and thus she continued for three months without further improvement. About three months after her accident, Dr. Graham was called, and on examination found that there was still considerable effusion in front of the external malleolus and behind the internal, pressure on which excited sharp pain, in the former more than the latter, and to these places was referred the pain, which was aggravated by passive motion of the foot, and this pain seemed to be the chief symptom in limiting the passive motion to a very slight degree of flexion and extension. After twenty minutes' malaxation or kneading with the palm of the hand and fingers, alternating with friction in an upward direction as far as the knee, the effusion was slightly diminished, the tissues were suppler, the limb felt more comfortable, and yielded more readily to passive motion. At the second visit a little resistance was added to the voluntary flexion and extension of the foot. At the third visit the spots, which had been painful on pressure, could bear vigorous manipulation very comfortably. Henceforth friction, malaxation, passive and acto-passive motion were persisted in half an hour or so daily. After the sixth massage she went up and down stairs naturally, and walked half a mile the eighth day after the treatment was begun. The patient has continued well ever since, and has had no relapse now over three years. 2. Miss A—— has been in a nervous, dyspeptic, half-invalid, loose-jointed condition for sixteen years. Nine months before Dr. Douglas Graham saw her, she was walking along an uneven road, her foot slipped, and in the effort to regain her balance she made a misstep, twisting her left foot. The foot swelled to about one-half more than its normal size, and the pain was referred mainly to the instep. For five weeks the recumbent position was kept, and antiphlogistics used. Mr. Graham at once began by giving the limb vigorous manipulation or deep rubbing as far as the knee, with brisk passive motion. After the first *séance* of twenty minutes, it was to be expected that

such a hyperæsthetic individual would be quite tired out and much worse generally, as was the case; but the theory was firmly adhered to that the more strength the limb gained the better able would she be to bear her numerous aches. On the day following the third massage the patient walked without limping any more, and after half a dozen visits in eight days she went up and down a long flight of stairs naturally and easily. At the end of ten days, after seven massages, Dr. Graham tied a handkerchief around the metatarso-phalangeal joints, and put one loop of this over the hook of a spring-balance, the indicator of which was pulled out several times to 12 lbs. by the upward movement or flexion of the foot. The other foot pulled 16 lbs. in the same manner. (*Med. Record*, No. 353.)

Lesions of the Intramuscular Nerves in a Case of Saturnine Paralysis, by M. Mayor.—A man, aged thirty-two, who had suffered much from lead colic, died of interstitial nephritis, after being affected for three weeks before his death by a typical lead paralysis of the extensors, which left unimpaired the muscles of the thumb and the extensor carpi ulnaris. The intramuscular nerves of the extensor communis and of the extensor pollicis longus were treated with osmic acid and then with carmine. Whilst the nerves belonging to the extensor pollicis were healthy, those of the extensor communis presented coagulation of myelin, atrophy of the axis-cylinder, multiplication of the nuclei, and in some nerve tubes complete atrophy of the myelin, so that the sheaths of Schwann were empty; finally a few fibres remained unimpaired. The muscular fibres of the extensor communis were partly in a condition of fatty degeneration of the nuclei, were reduced in volume, and presented considerable proliferation of the nuclei of the sarcolemma. The muscular fibres of the extensor longus pollicis were healthy. The changes correspond therefore fully to those appearing in peripheral paralyses, which do not, however, determine it to be of peripheral pathogenesis. The spinal cord and the roots in relation to it could not be examined. (*Deutsche Zeitschrift für praktische Medecin*, No. 43.)

Successful Treatment of Hay Fever.—Mr. G. Beard, of New York, was recently consulted by a gentleman from Chicago for what he had supposed to be a persistent cold, but which was really a case of hay fever. He had been troubled for several years, and some years he appeared to have all three forms: the early form, or nose cold; the middle form, or July cold; and the latter form, or autumnal catarrh. Thus he was a sufferer more or less for six months out of the twelve. He was treated in the manner suggested by Mr. Beard, which consisted in—(1) Central galvanisation; (2) a mixture of

Fowler's solution and nux vomica internally (3 to 5 drops to 10 or 15 drops); (3) the inhalation of a mixture of equal parts of camphor, carbolic acid, and chloroform; (4) gin and glycerine at night for the asthma and cough. This plan of treatment is based on the nerve-theory of hay fever, and the result so far confirms the theory. The central galvanisation gave, as it always, or almost always does, immediate relief. The nasal symptoms were quickly helped by the carbolic mixture, the asthma and cough by the gin and glycerine. Mr. Beard used experimentally several other remedies. The spray of bromide of ammonium, as suggested by Dr. Seguin, gave relief to the throat symptoms. A mixture of chloral and bromide of potassium and ammonium gave relief at night for a number of hours, and it also relieved other distressing symptoms of hay fever. The chloral should be used in small doses. Nitrite of amyl gives quick but brief relief in the asthma. The patient rapidly recovered, but has been advised to continue the Fowler's solution and nux vomica combination for a time to provide against relapse. (*Med. Record*, No. 353.)

Herpes Zoster treated by Chloroform Injections.—Dr. Doe of Boston gives the following case of herpes zoster successfully treated by chloroform injections. A man twenty-three years old entered the hospital July 23rd, with the following history. Ten days before, he began to be annoyed with pain in the chest about both nipples. In the course of a few days he noticed an eruption on the right side, which continued up to entrance. At that time the pain, severe in character, was mostly confined to the seat of eruption, extending across the axilla up to the right shoulder and down the arm towards the elbow. Appetite and digestion were good. Bowels and micturition were normal. Pulse 96, temperature 100°. An injection of fifteen minims of chloroform was ordered night and morning, locally in the affected side. After two or three injections the pain was entirely relieved, and remained so, while the eruption, which was a well-marked type of herpes zoster, left to itself, healed rapidly, and the patient was discharged well August 1st. (*Boston Med. and Surg. Journal*, October 18th, 1877.)

Treatment of Chronic Dysentery by the local application of Nitric Acid.—Dr. Hurt, at a meeting of the St. Louis Medical Society, reported the case of a man who had been suffering for five months from chronic dysentery, and had become greatly reduced in strength. The abdomen was full and tender. Treatment was commenced with dry-cupping and an emulsion of castor oil, turpentine, and laudanum. Tonics and astringents were afterwards administered, as iron, quinine, tannin, bismuth, and opium, variously combined, and in doses increased or

lessened according to indications. As the disease persisted other remedies, such as acetate of lead, camphor, ipecacuanha, and the sulphates of zinc and copper, variously combined with opium, were tried. The diet consisted of beef-tea, milk, soft eggs, rice, potatoes, and tapioca. This treatment was continued for four months without appreciable benefit. At length it was determined to make an examination of the rectum, and it was found to be almost completely denuded of its epithelium as far as the surface could be seen. After cleansing the bowel with pledgets of cotton a sponge lightly moistened with strong nitric acid was brushed over the surface. Steady improvement followed the application, and in the course of a month he was convalescent. (*St. Louis Med. and Surg. Journal*, vol. xiii., No. 10.)

Stibiodermic Treatment in Acute Articular Rheumatism.—M. I. Guérin read a paper at the meeting of the Paris Academy of Medicine on the 4th September on the abortive treatment of acute articular rheumatism by means of what he terms the stibiodermic method. This consists in the inunction every six or eight hours of an ointment containing one part of tartar emetic in two of lard. He states that a rapid reduction may thus be obtained of the pain experienced in the early stage of coxalgia. The cessation of the pain he attributes to a dynamic action of the remedy and not to any revulsive action. The same results were obtained in gout when the symptoms only preluded the definitive attack, three or four inunctions being sufficient to prevent the onset of the disease. When, however, the attack was fully developed, a flying blister, placed on the centre of the swelling, quickly effected its removal. (*Archives générale de Medicine*, November, 1877.)

Physiological Action of Pas-Pereira.—MM. Bochefontaine and C. de Freitas addressed a note to the Academie des Sciences on the physiological action of pas-pereira or geissospermum læve. Geissospermine is a poisonous substance, which does not appear to exert any irritant action preventing its introduction by the hypodermic method. In doses of two milligrammes it causes, when subcutaneously injected, death in frogs, whilst half-a-milligramme causes paralysis. One centigramme caused death in a large adult guinea-pig, and fourteen centigrammes suffice to paralyse all the movements of a small dog. The cardiac beats were observed to become slower, and the blood-pressure less. The respiratory movements also become less frequent. The voluntary movements were the first to cease. It seems then to act on the brain. Reflex movements were ultimately abolished, showing that the poison acted on the spinal cord and medulla oblongata. The sensory nerves appear to preserve their func-

tions as long as the motor muscular contractility is not affected by the poison. (*Ibid.*)

The Actual Cautery in Cutaneous Surgery.—Dr. Henry Piffard, Professor of Dermatology in the University of New York, advocates the use of the actual cautery in many affections of the skin, or the parts immediately subjacent. Thus in rosacea, varicose veins, angioma, nævus vascularis, epithelioma, lupus, cancroid ulcers, chancroids, venereal warts, pediculated tumours of the skin, and phymosis he has had much success in the use of the cautery. In A. rosacea, in which the veins of the nose, especially those of the alæ, are greatly distended, and more or less varicose, he touches the vessel to be operated upon with a fine platinum wire, heated to whiteness by a spirit lamp or small battery. The result will be obliteration of the vessel, reduction of a good deal of the congestion and infiltration around it, and ultimately a minute punctate scar, the size of which will depend upon the care and delicacy with which the operation is performed. In several instances he has secured obliteration of enlarged veins of the lower extremity by bringing the white hot platinum (heated by electricity) almost in contact with the vein. The platinum should not quite touch the skin, and should be held in position for a minute or more. The immediate result will be a blister upon the surface, and ultimately obliteration of the lumen of the vessel, and a pigment spot, more or less permanent, upon the integument. In case of nævus, the instrument should be heated to a red heat only, introduced and kept *in situ* some little time. If white heat were employed there would be considerable danger of hæmorrhage. When, however, the nævus is considerably elevated, the best way of operating is to make a small incision or puncture with a scalpel just through the skin at the edge of the nævus, then introduce the galvanic-cautery wire cold, close the battery circuit, and let the wire heat gradually, taking care that no more heat is employed than would suffice to redden the wire in the open air. When this is attained, open the circuit and carefully withdraw the wire. By this method of operating there will result coagulation of the blood and destruction of the vessels to a considerable extent around the wire and very little risk of hæmorrhage. (*Charlestown Medical Journal*, Jan. 1877).

Notes and Queries.

New Urinary Test-Case.—A very small case of this sort has been devised by Dr. Rayner W. Batten of Gloucester, which can easily and safely be carried in the waistcoat-pocket. It consists of an aluminium case about four inches long and half an inch in diameter, resembling in appearance the ordinary pocket caustic-holder, and similarly divided into two compartments. The smaller compartment (A) has within it three vulcanite specific gravity beads, marking the extreme and mean specific gravity of ordinary urine. The larger compartment (C) contains a test-tube, within which are three or four capillary-tubes, charged with nitric acid, and a bottle for Fehling's test-solution; this bottle is closed with an India-rubber stopper, upon which the alkali has no action. The screw-junction (B) uniting the two parts of the case is itself hollow, and holds, excluded from the air, the red and blue litmus paper. A wine-glass, and a candle or lamp, which can always be obtained, are all that can be further required. The specific gravity beads tell the specific gravity of the urine very accurately; whilst they have the advantage, a most important one at times, over the ordinary urinometer, that a very small quantity of urine, two or three teaspoonfuls even, will be sufficient for the purpose.

FULL SIZE

The best mode of using the nitric acid tubes is first to shake the acid down to one end of the tube, then to break off the other end by a sharp rap of a knife or other hard body; on inserting the open end of the capillary-tube just within the mouth of the test-tube, and heating the other end of the capillary-tube in the flame of the lamp, all the acid will be driven into the test-tube.

This pocket urine-case has been very neatly made by Messrs. Salt and Son, the surgical-instrument makers of Bull-street, Birmingham. All its parts are made to measure, so that at any time the bottle, test-tube, or charged capillary-tubes, of the proper size and length, can be obtained from the makers by return of post.

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Department of Public Health.

CENTRAL SANITARY ADMINISTRATION—THE LOCAL GOVERNMENT BOARD.

THE sixth annual report of the Local Government Board—the Department of Government which supervises the administration of the laws relating to the relief of the poor, to local government and to public health, in England and Wales—has recently been published. It refers to the year 1876-77, and presents an instructive picture of the magnitude of the interests which come under the observation of that Board and the responsibility of the functions which have been delegated by the Legislature to it. The report with appendices forms a portly volume, but a supplementary volume has still to appear containing the report of the Medical Officer of the Board. We propose in this notice briefly to summarise the division of the Board's report which relates to local government and public health.

The Board first refers to the provisions of the Rivers' Polution Prevention Act, 1876, which have already been noticed in the *Practitioner* (October, 1877). It next describes the proceedings it has taken during the period to which the report refers for altering the areas of sanitary districts in certain cases in order to give increased facilities for their sanitary improvement; for the settlement of boundaries of three places for the purposes of the Public Health Act, 1875—forming them into Local Government districts, in fact; for the settlement of a disputed boundary; for the dissolution of two special drainage districts, and the formation of twelve; for the alteration of the name of a Local Board; and for sundry changes in the number of members, the time for filling up vacancies, and the nomina-

tion of members of certain local authorities. Then the report proceeds to state the number of instances in which it had invested rural sanitary authorities with urban sanitary powers.

This power of investing rural authorities with urban powers, which the Local Government Board possesses, under section 276 of the Public Health Act, 1875, is exercised only on the application of an authority, or of a defined proportion of rate-payers of a rural district. It is commonly sought by, and has, indeed, been designed to meet the needs of, rural districts in which new centres of mining or other industry have been created and new buildings are rapidly increasing. The report does not say in how many instances the urban powers have been asked for in advance of the proposed establishment of new centres of industry, or in how many of them building operations have been for some time in operation. Our own experience is to the effect that these powers are rarely asked for until an almost irreparable amount of mischief from the construction of dwellings uncontrolled in their sanitary arrangements by the local authority has been done. In 1876 the Local Government Board granted urban powers to 52 rural sanitary authorities; in 1875 to 58; in 1874 to 44; and in 1873 to 10. The urban provisions usually conferred relate to the making of bye-laws for the cleansing of streets, the removal of refuse, and the construction of new buildings. In a few instances powers were also conferred upon rural sanitary authorities for the regulation of slaughter-houses and the lighting of public streets.

The subject of sanitary officers follows next in order in the report. During the year ending the 31st December, 1876, the Board approved of the appointment of additional medical officers of health to the number of 70 (14 by rural sanitary authorities and 56 by urban), and additional inspectors of nuisances to the number of 51 (6 by rural sanitary authorities, and 45 by urban). At the close of 1876, 42 district combinations for the appointment of medical officers of health and 17 district combinations for the appointment of inspectors of nuisances were in existence. The combinations for the appointment of medical officers of health embraced 140 rural authorities and 126 urban authorities; whilst those for the appointment of inspectors of nuisances embraced 15 rural authorities and 37 urban authorities.

In several instances district combinations for the appointment of medical officers of health expired during the year, and the authorities made separate appointments of such officers. Two appointments were made by the Board for districts situated wholly or partially within the same county, and these districts comprise 8 rural and 11 urban authorities. This would appear to mean that the Local Government Board has added a sort of county combination to its other curiosities of combination for the appointment of medical officer of health.

The total number of appointments now existing (deducting districts which have been dissolved and those which, having hitherto made separate appointments, have never been included in combinations) which the Board has sanctioned since the passing of the Public Health Act, 1872, is as follows :—

MEDICAL OFFICERS OF HEALTH.

By rural authorities	394
By urban authorities	387
By combined authorities (under sect. 191 of the Public Health Act, 1875)	42
By combined authorities (under sect. 286 of the Public Health Act, 1875)	2
	825

INSPECTORS OF NUISANCE.

By rural authorities	507
By urban authorities	319
By combined authorities (under sect. 191 of the Public Health Act, 1875)	17
	843

Medical officers of health and inspectors of nuisances, have also been appointed by 45 out of the 46 port sanitary authorities which have been constituted.

The loans effected by sanitary authorities and sanctioned by the Central Government form the next subject of the report, and it would appear that from the formation of the General Board of Health in 1848 to the end of 1876 this amounted to no less than £18,357,454. Of this sum of money £2,956,178 was sanctioned by the General Board of Health during the ten years following the passing of the Public Health Act, 1848; £7,363,366 by the Secretary of State, during the next thirteen years; and

£7,770,348 by the Local Government Board during the five years which elapsed from the 31st December, 1871, to the 31st December, 1876. The loans sanctioned during the last three years of this period, the Board observes, "make up more than a third of the total amounts which have been sanctioned during the last 29 years." Upon this fact the report says:—

"The remarkable increase in the amounts of the loans which have been sanctioned of late years, as shown by the foregoing statement, affords the most convincing proof of a growing disposition on the part of sanitary authorities, as at present constituted, to execute, both in urban and rural districts, permanent works of sanitary improvement under the general law."

But the sum mentioned does not represent the whole or even the greater part of the money obtained in loans during the period referred to by sanitary authorities. In addition to the loans, which have had to receive the sanction of the Central Sanitary Authority, are the loans authorised by Parliament under local acts. For example, the sum of money borrowed by sanitary authorities under the sanction of the Local Government Board in 1876 was £2,757,323 (urban, £2,563,608; rural, £193,615). But the loans, authorised under local acts during the same period, it is estimated would exceed £4,000,000. On the 25th March, 1876, the total outstanding loans of urban and rural sanitary authorities were as follows:—of urban, £38,546,284; rural, £204,456; total, £38,750,740.

In the course of 1876 the Board confirmed, on applications made, 65 separate sets of bye-laws as to new streets and buildings, 47 as to the prevention of nuisances, 37 as to common lodging-houses, 2 sets as to houses let in lodgings, 44 sets as to slaughter-houses, 12 sets as to hackney-carriages, 3 as to stands of horses, &c., for hire, 1 set as to bathing-places, 1 as to public baths, 8 as to markets, 5 as to hop-picking, and 3 as to the regulation of the business of a blood-boiler, of a tripe-boiler and a knacker. 2 sets were also confirmed as to tramway carriages, and 1 set as to preventing waste of water.

The report directs attention to the number of provisional orders issued by the Board during the year as affording evidence of the developing activity of sanitary authorities, but also as evincing a growing appreciation on their part of the advantages which the system of provisional orders presents as compared

with that of local acts. In 1874, 50 provisional orders had been issued by the Board and confirmed by Parliament; in 1875-76, and during the year to which the present report refers, 1876, 100. Four of the last-mentioned number were issued under the provisions of the Artisans and Labourers' Dwellings Improvement Act, 1875, one under the Gas and Water Works Facilities Act, 1870, one under the Nottingham Improvement Act, 1874, and the remaining 94 under the Public Health Act, 1875. The orders issued under the Public Health Act effected a great variety of objects, among which were comprised alterations of areas, including the extension, diminution, dissolution, and constitution of urban sanitary districts and the dissolution of special drainage districts; the repeal, in some cases entire, in others partial, of local acts; the amendment of local acts; the acquisition of powers for the compulsory purchase of lands for purposes of water supply, works of sewerage and sewage disposal, street improvements, markets, the erection of offices, &c., alterations in the incidence of rating, the settlement of doubts and differences, and the adjustment of liabilities arising out of the transfer of powers and property from one sanitary authority to another, and the application of special provisions contained in local acts to extend areas.

The provisional orders issued under the Artisans and Labourers' Dwellings Improvement Act related to four schemes proposed by the local authorities of Birmingham, Liverpool, Nottingham, and Swansea. These schemes were the first to which effect had been given since the passing of the Act, and on this account, as well as from their intrinsic interest, we quote the summary of them given in the report.

"The most important of them in point of magnitude was that of Birmingham. From the estimates which accompanied this scheme, it appeared that the total area of land to which it related, including the site for the erection of dwellings for persons of the working class, was 449,135 yards, or nearly 93 acres; that of this it was anticipated the Urban Sanitary Authority would acquire about 209,496 yards, or about 43¼ acres, at a total cost of about £1,310,000; that the proposed new streets shown on the maps accompanying the scheme would absorb about 38,522 yards, or nearly 8 acres; that the estimated cost of making them was £34,000; that the estimated improved value of the surplus lands was £794,000; and that the total estimated net cost of carrying out the scheme amounted to £550,000.

"The whole of the locality comprised in the scheme as originally submitted was

assumed to be an unhealthy area, and it was proposed that the Urban Sanitary Authority should be empowered to take compulsorily all or any of the lands included in it. The result, however, of the local inquiry which was held in this case was to convince us that a portion only of these lands constituted an unhealthy area within the meaning of the Act; although it appeared that another portion of them was necessary to be included in the scheme for making it efficient for sanitary purposes, and for widening the existing approaches to the unhealthy area, or for opening it out for the purposes of ventilation or health; and that a further portion was required for the purpose of providing for the accommodation of the persons of the working class, displaced in the areas with respect to which the scheme was proposed.

"We accordingly modified the scheme in these respects, while at the same time we conferred upon the Urban Sanitary Authority compulsory powers of purchase in respect of the lands required for each of the above purposes. As regards the remainder of the lands included in the scheme, it did not appear to us that any compulsory powers were required.

"We also imposed, as a condition to the carrying out of the scheme, that so much only of the areas included in it should be cleared of buildings at one time as would be sufficient for the provision of accommodation for at least 500 of the persons displaced in carrying it into execution, and that no further clearances should take place until dwellings for a similar number had been completed.

"Amongst other powers conferred upon the Urban Sanitary Authority by the scheme were powers for the laying out, paving, sewering, and completion of certain new main streets, with approaches and communications; for the alteration and stopping up of certain existing streets; and for the appropriation of any parts of the unhealthy area, and certain sites in the vicinity thereof for the erection of suitable dwellings for the working class. The Authority in carrying these powers into effect, were required to provide for the accommodation of at least as many persons of the working class as should be from time to time displaced in the unhealthy area; and to enforce the execution and maintenance of all proper sanitary arrangements within the area. All dwelling-houses to be erected in accordance with the scheme were required to be well and substantially built, and to be so situated and constructed as to secure efficient ventilation, and be furnished with a proper water supply and drainage, and other sanitary appliances and apparatus to the satisfaction of the Authority.

"The Liverpool scheme related to an area containing about 22,487 square yards, of which 3,717 were laid out as public streets, and 18,770 were covered with low-class dwellings and buildings, or yards used for trade purposes. It was proposed that the whole of the property within it should be purchased or taken compulsorily, the buildings removed, the ground filled up to a proper level for building purposes, the new dwellings arranged in accordance with the best sanitary conditions, and so as to accommodate an increased number of persons besides effecting an important street improvement. The number of persons of the working classes to be displaced in this case was stated to be 1,100, and the scheme provided for their accommodation by retaining and setting apart sufficient land within the area on which to erect suitable dwellings for at least as great a number as might be displaced. All buildings erected within the limits of the area were proposed to be so placed as to secure light and air on two sides of each building or dwelling in such a manner as to secure thorough ventilation; each dwelling was to be supplied with water, and to have a separate water-closet; and the streets, open places, and carriage-ways were to be formed by the Urban

Sanitary Authority, and to be efficiently drained, paved, and lighted. The net cost of carrying the scheme into execution was estimated at £62,254.

"In this case the Urban Sanitary Authority were desirous of being empowered to modify the scheme, if necessary, by devoting a portion of the land for dwelling-houses of the ordinary kind or for shops; but we did not consider that the circumstances were such as to justify us in assenting to this proposal. In other respects we confirmed the scheme, subject to the condition that one particular property affected by it should not be purchased except by agreement.

"The Nottingham scheme, which had reference to a comparatively small locality, provided that the whole of the land included in it should be taken compulsorily; the buildings pulled down; the materials cleared away; and the site disposed of by public auction, for the purpose of erecting thereon shops and manufacturing, commercial, or public buildings, the elevations, plans, and specifications of which were to be submitted to and approved by the Health Committee of the Town Council.

"A peculiarity of this scheme was that no portion of the condemned area was proposed to be appropriated for buildings for the working class; the sites selected for this purpose being situate upon other land known as the Chamber Estate. In confirming the scheme we made a stipulation that no part of the unhealthy area should be cleared of buildings until accommodation had been provided on the estate in question for the persons displaced.

"The net estimates in this case were, for the acquisition of the unhealthy area £1,000, and for the erection of working men's dwellings £8,000.

"The Swansea scheme related to several areas, in respect of which an official representation had been made by the Medical Officer of Health; and the number of persons to be displaced by it was stated to be 1,753. The cost of acquiring the sites in this case was estimated at £61,280; of which it was expected that £49,192 would be realised by re-sales; leaving £12,088 as the net cost of the improvement. Before confirming this scheme we excluded a portion of the lands originally included in it; and stipulated that so much only of the several areas should be cleared of buildings at one time as would be sufficient for the provision of accommodation for at least one-third of the whole number of persons displaced; and that no further clearances should take place until dwellings for that proportion had been completed; the same provision being rendered applicable with respect to the clearance of the remainder of the areas."

We simply refer in passing to the sections of the report which relate to the compensation of officers on abolition of office, to special expenses, to adjustment of accounts, and to the proceedings of the Board with reference to port sanitary authorities. It would appear that the Board was called upon to advise as to numerous local acts promoted during the last session of Parliament, and to report upon no less than thirty-five private Bills—all referring to matters of local government and sanitary works.

The report gives a summary of the information which has been communicated to the Board on the operation of the Sale of Food and Drugs Act, from which it appears that in some districts a large number of samples have been submitted for analysis; in

others, although analysts have been appointed, no samples, or scarcely any, have been sent them. The number of authorities who had appointed analysts, with the approval of the Board, up to 31st December, 1876, amounted to 126 (counties 36, boroughs 51, district boards and vestries in the Metropolis 39).

The Alkali Acts of 1863 and 1874 are reported to be working beneficially. Dr. Angus Smith states that the liability of vegetation to injury caused by the evolution of noxious gases from chemical works has greatly diminished since the Acts came into operation, and that this result is as much owing to voluntary action on the part of manufacturers as to the exercise of the compulsory powers given by the Acts.

The Water Examiner appointed to report on the operation of the Metropolis Water Acts, Major Bolton, R.E., states that the number of houses receiving constant supply from the several water companies is steadily increasing, though much remains to be done in this respect.

The remainder of the report is devoted to an account of the proceedings of the Board in relation to turnpikes and highways, to local taxation returns, to appeals against auditors' decisions, to vaccination, to medical inspections, to the reports of medical officers of health, to hospital provision for infectious diseases, and to foreign epidemics. We propose to defer a consideration of the sections relating to vaccination and the work of the medical department of the Board until the appearance of the Medical Officer's Report. The subject of medical officers of health's reports is dealt with in a separate article.

The foregoing brief summary of the contents of the annual report of the Local Government Board, with reference to its local government and public health functions alone, will perhaps furnish some conception of the multifarious and, it might seem, in some respects, incongruous functions of that department of the Government.

INTIMATE SANITARY WORK:—REPORT OF MEDICAL OFFICERS OF HEALTH.

THE recently published annual report—the sixth—of the Local Government Board contains some noteworthy remarks on the annual reports of those medical officers of health who are to some extent under the control of the Board. Each medical officer of health, whose salary is partly paid from the Parliamentary grant, is required to submit to his sanitary authority an annual report of his own work and of the sanitary condition of his district, with statistics of the sickness and mortality of the year, and to transmit to the Local Government Board a copy of such report. More than 1,100 of these reports were received by the Board in 1876. It would appear that the several reports were submitted to careful examination, and in cases where it seemed necessary, and where "the care and precision" of the reports justified such a course, the Board communicated with the sanitary authorities as to the action taken, or proposed to be taken, for the improvement of their districts. "This has entailed upon us," the Board observed, "a large amount of correspondence, but we have reason to believe that commensurate advantage has resulted, as is likely to result, from the advice which we have been able to give to authorities as to the various sanitary matters requiring attention."

Many of the annual reports the Local Government Board received in 1876, it is stated, afforded "abundant evidence, not only of sanitary activity, but of sound sanitary advice and useful action;" it is added, however, that "a large number" did not give adequate information with regard to the conditions of the district and the work of the medical officer of health, nor have supplemental reports, which the Board has called for "in many such instances," been satisfactory.

Of the reports generally, the Local Government Board observes, they show that the instructions upon which they are framed have been very diversely interpreted by different medical officers of health, and it has been deemed necessary to prepare

and issue more detailed instruction as to their preparation. Especially, the Board says :—

"One thing which we had particularly noted in the reports of previous years was a too common tendency among Medical Officers of Health to regard themselves as principally, if not exclusively, concerned with actual outbreaks of infectious disease, to the neglect, as it seemed to us, of their still more important function of seeing that their districts were (so far as the action of the Sanitary Authority could secure them) protected against disease by the removal of all conditions likely to injure health. The instructions, therefore, while requiring of course that the reports should contain a full account of the measures taken by the Medical Officer of Health, or by the Sanitary Authority on his advice, in preventing the spread of disease in the district, dwelt specially upon the importance of the systematic inspections of the district, which the Medical Officer of Health is required by our order to make periodically with the object of discovering the existence of unhealthy conditions ; and upon the necessity of fully reporting the results of these inspections, and the steps taken to remove any unwholesome conditions discovered."

The foregoing remarks are of less importance with regard to the censure of medical officers of health which they apparently convey, than with regard to the indication they afford of the Local Government Board unlearning some of the egregious errors, by which that Board has hitherto frustrated the essential object of the Public Health Act, 1872. The mistaken direction of the medical officer of health's work, which the Board now animadverts on, was one of the necessary results of Mr. Stansfeld's policy in the inauguration of the new sanitary organisation appointed under the Act referred to. Notwithstanding the protests of the medical profession, and the dictates of common sense, the local agents employed by the Local Government Board in initiating the new administration were the former inspectors of the Poor Law Board, gentlemen wholly unversed in sanitary matters and in the peculiar function of sanitary officers. As if to secure their certain failure and the sure frustration of the Public Health Act, these gentlemen were despatched upon this duty without any instruction whatever as to the technical aspects of the work they entered upon, each being left to evolve his notions of the intimate work of sanitary administration from his own consciousness. We need not do more than recall the distressing confusion which followed upon this astounding method of procedure in a great public matter. No two inspectors agreed at the outset in the advice they tendered to the new sanitary

authorities, or as to the principles on which the organisation for the detailed sanitary work of the district should be organised. The pitiable result is, alas! but too well known in contrarieties and futilities of arrangements for the detailed work of sanitary districts which lie like a nightmare upon the labours of the sanitary authorities. It is no exaggeration to say that the chief difficulty of the Local Government Board in supervising the sanitary administration of the kingdom arises from the necessary blunders of its own trusted agents. No better illustration of this fact could be given than this question of the annual reports of medical officers of health, dealt with in the last report of the Board.

Before the Local Government Board issued its regulations as to the detailed duties of medical officers of health and inspectors of nuisances, the General Inspectors of the Board—the former Poor-law Inspectors—were at work advising sanitary authorities as to the "general" duties of these officers. Previous experience on the subject having, consistently with Mr. Stansfeld's policy, been wholly discarded as unnecessary under the circumstances, the inspectors found it much easier to form some sort of notion as to an inspector of nuisances' duties than as to those of a medical officer of health. Not, indeed, that they in reality formed a more accurate conception of the duties of the former than of the latter. But there were certain duties as to nuisance removal which were patent to everybody, and obviously the occasion for their exercise existed everywhere. Such was not the case, however, with regard to the medical officer of health, in the view of the general inspectors, and their conception of his functions could not get beyond the duties connected with the arrest of infectious diseases. Holding the more obvious duties as the more important, the inspectors deliberately reversed the relationship of the inspector of nuisances to the medical officer of health, in sanitary administration, and gave the primary position to the former officer, while of the latter, they held his functions to apply rather to occasional than to current matters of sanitary work. This point of view has, perhaps, been most neatly expressed by Mr. J. J. Henley, one of the general inspectors of the Board, in a report called for by Mr. Stansfeld, among other reports of the inspectors,

and presented to Parliament in session, 1875. In this report Mr. Henley observes, "It is only in those more serious and happily rarer encounters, with enemies whose detection and extermination require the weight and the authority of science, that the intervention of the medical officer of health will be indispensable. In ordinary times and under ordinary circumstances it is the inspector of nuisances who will fight the sanitary battle."

We have already stated that the general inspectors of the Local Government Board commenced the work of initiation of the Public Health Act, 1872, before the official regulations as to the duties of a medical officer of health and inspectors of nuisances were issued. The duties of the medical officer of health, as set forth in the regulations, as must now be well known to the profession, are utterly irreconcilable with the view of these duties expressed by Mr. Henley, and which is known to be held in common by his colleagues. Mr. Henley's observations above quoted were written in 1874, a year and a half after the issue of the regulations, and in the appendix to the recently published report of the Local Government Board there are reports from one of the general inspectors, which are only explicable on the view that the same conception of the medical officer of health's duties are still acted upon by these gentlemen, the Board's regulations notwithstanding. Indeed it cannot be questioned that in respect to these regulations as to the regulations of the medical officers of workhouses, the inspectors have been suffered to give prominence, as to this or to that portion, suffering the remainder to fall into neglect or disuse.

Now the shortcomings of the medical officers of health, to which the Local Government Board now directs attention in the paragraph we have quoted from their report, arise wholly from the fact that the gentlemen censured have accepted the interpretation of their duties adopted by the General Inspectors of the Board. Just, indeed, as the medical officers of workhouses have been allowed to neglect the important duty of keeping their register of sickness under like circumstances, so have medical officers of health been allowed to neglect the clearly written regulations as to their ordinary current work. In both instances these officers have been instructed to look to the

General Inspector for guidance, in both they have done so. We know the scandalous results as to pauper records of sickness; we now know that the same sort of neglect has been, after a five years' experience, brought about with regard to the most important functions of the medical officer of health. In this latter case, however, it now appears that the Local Government Board has comparatively early awoke to a sense of the gravity of the consequences of this imperfect interpretation of the duties of a medical officer of health, and that it is now taking steps to remedy the blundering of its own agents.

The apparent censure of the medical officers of health, as to their reports by the Local Government Board, is misplaced. But this is an unimportant matter compared to the fact that the Board has now recognised the advisability of seeing that its own regulations are carried out in their integrity.

THE PRACTITIONER.

FEBRUARY, 1878.

Original Communications.

ON QUINETUM AND ITS THERAPEUTICAL VALUE.

BY DR. H. J. VINKHUYSEN,

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THOUGH the history of quinetum would present to the impartial reader an excellent illustration of the difficulties which have to be overcome in order to gain general acceptance for a scientific truth, I do not propose to enter upon it here, but will confine myself to relating in a few words the conclusions to which I have been led by a practical inquiry into the actions and uses of the remedy.

The name quinetum was given by my illustrious compatriot, Dr. de Vry, to the collective alkaloids obtained from Peruvian bark by a very simple process. By repeatedly inviting medical men to test the utility of this medicine, by supplying them with pure specimens of it, and searching for the best forms of prescribing it, he induced several physicians at the Hague, and throughout Holland, to use it extensively in several cases where the salts of quinine had been habitually employed.

I have prescribed it in a hundred different cases, and from this number, I think I am fairly entitled to draw some definite conclusions. I shall narrate several of these cases at length,

as they afford instructive examples of the action of this remedy.

1. Lady J. suffered from tertian ague, with great disturbance of the nervous and circulatory systems. This patient could not tolerate quinine on account of the unpleasant symptoms which were invariably produced by it, even when the dose was very small. These symptoms consisted in great præcordial anxiety and asthma. When hydrochlorate of quinetum was given it did not produce the slightest trace of these symptoms, even when administered in doses twice as large as those of sulphate of quinine. The good effect, however, was strongly marked, and complete disappearance of the febrile symptoms in a very short time could be observed.

2. Mr. van Lonsberge, our present governor-general in the colonies, was a martyr to facial neuralgia, for which he took sulphate of quinine. This invariably caused him great suffering by bringing on noises in the ears, which were so loud that it became quite impossible for him to work, or even think, on any day that he took quinine to relieve the intense neuralgic pain. In his case quinetum relieved the pain even more quickly than quinine without bringing on the hallucinations of hearing which he so much dreaded.

3. Mrs. S. N., during the early months of pregnancy, suffered from œdema of the feet, retching and disturbances of vision, which were the precursors of a violent attack of eclampsia. She was successfully treated by depletion, and the eclamptic symptoms disappeared, but an abnormal frequency of the pulse still remained. During the whole day the number of pulsations was never less than 130 per minute. This symptom appeared to indicate quinine, but we were afraid to prescribe the alkaloid on account of the symptoms of congestion, which it is apt to produce. As the action of quinetum resembles that of quinine, I was induced to give it instead of the latter in doses of four grains a day. The result justified my expectations, for in three days the pulse sank to seventy-two.

There is, perhaps, no country where malarious intermittents are so common as in Holland. The effects of malaria do not always present themselves as intermittent fever with regular paroxysms, or as pernicious fever with dangerous symptoms.

We often meet with affections of the most diverse kinds, which are connected only by having the malarious poison as a common cause.

The proteus-like forms of malarial poisoning are known under the name of "larval" or "masked malaria." In these affections quinine has not the same powerful, therapeutical action as in cases which are acute and obviously due to the action of the poison. In the greater number of them we are obliged to have recourse to quinoidine in combination with quinine. It was therefore natural to try quinetum in these cases, and experience showed that it effected a more radical cure than quinine in chronic malarial intoxication.

4. Mr. R. complained of pains in the legs, having the character of sciatica, which were brought on by walking after sunset, and which recurred at the same time of day. By taking quinine with aconite the pains were relieved for three or four days, but after that time they returned. On giving him quinetum for three weeks they vanished altogether.

5. It is very interesting to compare the action of quinine and that of quinetum on the temperature of the human body. For this purpose I administered quinetum in a case of petechial typhus on the tenth day, when the temperature of the patient was 41°C. Three grains were given in divided doses, one grain being given every half-hour. After two hours the temperature had fallen to 38·2°C., without any of the disagreeable symptoms that we usually observe when quinine is employed.

6. It is a common custom amongst men who have passed several years in tropical regions to take several grains of quinine when they suffer from a feeling of general weakness. After the quinine they feel quite well again. This tonic effect of small doses of quinine is observed still more markedly when quinetum is employed.

7. The son of Mr. T. suffered from quotidian ague after very intense bleeding from the bronchial vessels. Quinine caused intense vomiting, which was very dangerous under the circumstances, and as the vomiting could not be checked, I gave up the quinine and used quinetum instead. The result was highly satisfactory, for the quinetum did not cause the least vomiting, and had the desired effect of checking the ague.

From the observations I have made, and from which I have selected the above, I believe that we may affirm with perfect safety the following conclusions:—

1. The only malarious disease in which quinetum cannot be employed in place of quinine is pernicious fever. Quinetum requires more time to act than quinine, and as rapidity of action is absolutely necessary in this disease, quinetum cannot be used in it as a substitute for quinine.

2. In all forms of pure malarial intermittent fever, quinetum has the same apyretic effect as quinine, but is less powerful, and acts more slowly. It must therefore be given in large doses and at longer intervals before the ague fit, than quinine.

3. Quinetum does not produce the unpleasant and even dangerous symptoms of quinine when given during the fit, and may be taken during the fit without causing any unpleasant feeling.

4. Quinetum never causes noises in the ear.

5. Persons who are liable to suffer from the toxic effects of quinine, and who therefore cannot take it without the greatest discomfort, can take quinetum without this unpleasant effect, and yet obtain a similar therapeutical result.

6. The influence of quinetum in chronic cases is greater than that of quinine.

7. The tonic action of quinetum is similar and perhaps even greater than that of quinine.

8. The action of quinetum in cases of masked or larval malaria, and especially in rheumatic affections due to malarious influences, is incomparably greater than that of quinine.

ON THE ACTION AND USE OF HYOSCYAMINE.

BY H. CLIFFORD GILL, M.R.C.S.,

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In the following paper I purpose to discuss some of the actions and uses of the alkaloid hyoscyamine, or rather, in the form in which I use it, an extract containing the alkaloid in an amorphous form.[1] It is of a dark, olive-green colour, and about the consistence of treacle. It is readily soluble in alcohol and ether, but more freely, I think, in a mixture of these two. Of the mode of preparation of this valuable drug I shall say nothing; but any one wishing for further information on this head will find a full description in the Journal of the Pharmaceutical Society for August 23, 1873. Of this extractive I make a solution of a given strength for dispensing purposes. There is also a crystalline alkaloid hyoscyamine and its sulphate corresponding to atropine and its sulphate; but, therapeutically, I am led to believe there is no great advantage to be gained, and the cost is at present almost prohibitive—3s. 6d. per grain. While on this branch of the subject I should state that, for reasons to be afterwards described, it is very desirable to give the alkaloid in a very freely diluted state, or otherwise unpleasant symptoms referable to the stomach are apt to arise. This solution contains exactly half a grain of hyoscyamine to the ℥j. The formula which from experience I have found most convenient is: hyoscyamine gr. x., Sp. Vin. Rect. ℥j, and Æth. Sulph. ℥iv. The two latter are mixed, and this mixture will freely dissolve the hyoscyamine; then make up the quantity to twenty ounces with water. The solution is quite clear and of a bright brown colour, and of a disagreeable pungent odour and taste. The reason I have adopted

[1] Merck's amorphous hyoscyamine, supplied by Messrs. Harvey and Reynolds, of Leeds.

the half grain to ℥j is to simplify the administration of the medicine in doses which are multiples of one-eighth of a grain, which of course affords facility for dispensing. Two precautions should be taken; first, not to keep the solution too long, as it changes its properties and becomes nearly inert; and second, to avoid prolonged exposure to light by keeping it in a dark place. With regard to its administration, from an experience of my own of sixty-five recorded instances of administration, I can recommend a dose varying from one-eighth to three-eighths of a grain, and in exceptional cases three-quarters, or even a grain may be given with perfect safety.[1] I never give three-eighths of a grain in less than two ounces of water, as vomiting is sure to follow, and perhaps, even, as occurred at Wakefield, hæmatemesis, the drug when concentrated appearing to have a powerful local action on the mucous membrane of the stomach. So much then for the drug and the mode of its administration. I will now proceed to discuss its use. If a moderate dose of hyoscyamine be given to a healthy man he will exhibit many of the phenomena of an attack of mania, plus certain well-marked physical conditions; he becomes loquacious, incoherent, rambling, and has certain well marked hallucinations of vision and audition, great weakness, especially of the lower limbs, and considerable loss of co-ordination, similar to that seen in a drunken man, intermittent drowsiness, hypermetropia, dryness of lips and throat, and, not uncommonly, vomiting.

Now it was once thought that if in a person already the subject of disorganised brain action another process could be induced, a reaction might take place, and a changed condition for the better be the result. Be this as it may, as a fact, great benefit and amelioration does take place in many classes of cases, and this too when all the more common forms of narcotics, such as the various preparations of morphia, chloral, cannabis indica, conium, &c., not forgetting the universal neural panacea, bromide of potassium, have been tried and have proved failures. Some of these points are well elicited in the treatment of the following case, which I shall describe somewhat fully:

[1] As much as three grains has been given as a single dose to a healthy man; yet, in my opinion, such large quantities are totally unnecessary and by no means unattended with danger to the patient.

L. T. C., an officer in the army who had served many years of his life in active service in India, fifty-seven years of age, was admitted, suffering from acute mania, July 20, 1877. He had been ill, and gradually getting worse since May last, and had undergone ordinary treatment, first at Colchester, then at Brighton, and, as no improvement took place, he was removed to the Royal Military Hospital, Woolwich. Here he remained a month, but no benefit resulting, he was brought to the York Lunatic Asylum, Bootham. His history is indifferent and led one to form from the first a rather unfavourable opinion. His brother died from a severe attack of acute mania after a few weeks' illness, and his father was, to say the least, very eccentric. Patient had always lead a very steady and sober life. His sons have turned out badly. On admission I found him talkative and excited in manner, but there was no particular display of violence, his manner being familiar and friendly. He said this was the head-quarters of the Prince of Wales, that I was His Royal Highness, and he himself Lord Napier of Magdala, and that he had come to join my staff. He also in conversation said that they had attempted to poison him by putting poison in his food, &c., &c.

On the 4th and 5th of August he began to manifest symptoms of greater violence, severely kicked his attendant, upset one or two of the patients, &c., &c., under the belief that he was God Almighty.

6th. After a period of many hours calm he suddenly made a rush and jumped through a window into the garden below, a height of at least twenty feet, fracturing his thigh in the fall and sustaining a severe shock to his spine, whereby his bladder was for some days paralysed, necessitating the constant use of the catheter twice a day. He afterwards explained to me the reason under which he acted in getting out of the window, viz., that he was Jesus Christ and he was not going to allow himself to be crucified by us, whom he designated as Jews. Patient suffered very much from severe shock for several days. The leg was carefully set under chloroform, extension being maintained by the weight and pulley apparatus.

10th. He became very bad and troublesome with noisy, acute delirium, numerous delusions, and frequent attempts to remove

the apparatus. He had no sleep all night and required the constant attendance of two, and sometimes three, attendants. Three-eighths of a grain of the hyoscyamine were administered, and were followed in one and a half hours by a perfect, quiet, and tranquil sleep, which lasted from four to six hours. On waking he complained of thirst and dry tongue, which was previously moist. There was no vomiting; pupils noted as being very little affected; and this I have noted in other cases, where great benefit has resulted and sleep has been quickly obtained.

11th. Dose was repeated with the same results. The patient's appetite was very fair, but he complained of thirst.

12th. He was better, and did not require a dose.

13th. The patient was much worse, and three-quarters of a grain were administered. In an hour the patient became comatose, pupils only slightly dilated, capillaries intensely injected, pulse 150, respiration short and very rapid, jaws dropped, eyelids partially closed, and eyeballs exposed and turned upwards. In this very critical-looking state (which alarmed me not a little at the time) he remained for four hours, but after this time, though he was drowsy and stupid, he could easily be aroused. Such appearances as above described we find from further experience of its action not to indicate danger. But as death occurs in fatal cases for the most part from syncope, it is as well not to attempt to arouse the patient, and an egg and brandy enema would be the utmost to be attempted. I did nothing. On awaking he took some brandy and milk, and then slept quietly till 10 P.M., very thirsty, tongue dry, pulse fallen to 120 and very irregular, *skin very moist.* He became very sick and vomited everything from 3 to 5.30 A.M.

14th. The pupils were noted as being somewhat dilated, the pulse had fallen to 80, skin natural and moist. Did not sleep all night, but was quite quiet, and is in the same state this morning. He still has numerous delusions. Thigh doing well. No drugs administered to-day; takes his food well, sickness much relieved by ice and soda-water.

15th. Passed a fairly quiet day but talks a good deal, and his language very characteristic of the barrack-room. During the evening became noisy, and three-eighths of a grain were administered.

16th. Is reported to have passed a good night and, with the exception of a good deal of singing and incoherent blasphemy, may have been said to have had an average day. His delusions are those of mistaken identity and grandeur, he being the Deity, his nurse the Virgin Mary, &c., &c.

17th. To-day I altered the treatment. He had three-eighths of a grain in the morning and slept four hours, but in the evening became very bad, swearing and fighting to get bandages off. I gave thereupon ℥xlv. Liq. Opii Sed. This was followed by two hours' sleep, but he then became very troublesome and continued so all night, requiring three attendants.

18th. Very troublesome. Three-eighths of a grain, which, though it did not produce sleep, produced calm for four hours, and at bedtime, 10 P.M., as noise and turmoil threatened, I gave him ʒj. Liq. Opii Sed. It was not of the least use. He was most troublesome all night.

19th. Pretty quiet for him during the day but passed a very bad night; indeed, the worst he has had as yet. Has made constant attempts to get off the bandages, and has smashed his urinal to atoms, cursing and swearing and spitting all over the place, dirty and wet in bed, and trying to get out of bed. Tried to administer three-eighths of a grain of hyoscyamine but failed, as he would not take it, and is so violent that two strong men besides his nurse are required to hold him in bed. Thinking that the paroxysm might pass off if sleep could be induced, I put him fully under the influence of chloroform; but as soon as the action had passed off he was as bad as ever. A good deal of vomiting followed, but otherwise the patient takes chloroform excellently. As it now became evident that unless this attack abated he must sink from exhaustion, I gave him half a grain morp. acetat. hypodermically, but this had no effect, and at 3.30 P.M. he was just as bad as ever. However, I succeeded in getting him to take three-eighths of a grain of hyoscyamine. At 4.30 he was quiet but not asleep, pulling the bedclothes as if searching for imaginary insects; there was twitching of the limbs, a flushed and drunken expression of face, pulse 150, pupils somewhat larger than normal, but only slightly so. At 5.30 he is in a quiet, peaceable sleep, respiration regular and full, pulse 120, soft, full, and regular, face very flushed,

skin moist. He slept all night and in the (20th) morning pulse 86, respiration natural, tongue clean and moist; asks for food, is quiet and much more rational. This was the turning-point in the case, for though for a long time after this he was very insane and unmanageable, he, on the whole, continued to gain ground daily.

21st. Going on very well; takes food well, and slept all night without any drugs.

22nd. Ditto. The urine, which has been very bad and ammoniacal, is now getting much less so, causing less difficulty to pass.

23rd. This evening, after a visit from his wife, he is again excited and passed a very restless night, most violent swearing, &c. Gave him at 10.30 this morning three-sixteenths of a grain of hyoscyamine. At 1 he was subdued, face flushed, and vomited; but by 5 P.M. was as bad as ever. Repeated hyoscyamine, giving three-eighths of a grain; quiet and drowsy at 11 P.M., with a pulse of 150, slept soundly from this hour till 2.30 A.M., and then at intervals till morning, when he is reported as being quiet but cross.

26th. 5j of liq. morp. was administered with no effect, and at 5 P.M. three-eighths of a grain of hyoscyamine. Slept from 7.30 till 11.30, when he was restless and sick.

27th, 28th, and 29th. It was necessary to give him three-eighths of a grain; in each case sleep or rest was produced.

30th and 31st. He was quieter and did not require any drug.

During September I was from home, but the patient's general condition continued to improve.

During October it was only occasionally that he required the hyoscyamine, as there was a steady improvement in his mental as well as bodily condition. This continued during November, and with the exception of tonics and good diet and fresh air, no special treatment was called for, and on December 15th he was discharged quite well.

It would be difficult to find a case more complicated than this. So severe an attack of acute mania in an Anglo-Indian at 57 years of age is in itself no light matter, and the complication in this case, with a bad fracture of the upper third of the right thigh, with the paralysis of bladder, made the prognosis

most grave. There is very slight, if any, shortening of limb, the slight resulting lameness being due to loss of power and atropy in the extension of the foot.

Another case in which singular benefit has been derived is that of J. G., a case of acute paroxysmal mania with filthy and destructive habits. In him three-eighths of a grain produced a great amelioration. A course of one-sixteenth of a grain taken for a week rendered the patient tidy, cleanly, and, though muddled and stupid, he was very much improved. The improvement continued, and he is now convalescent—pupils dilated.

E. P., another most noisy violent case of chronic mania, is immediately quieted by a single dose; the patient always vomits and appears half drunk, the effect remains afterwards—pupils only slightly dilated.

C. S., a case of mania with chronic delusions, loses power over limbs, and also vomits. She is on the whole considerably better for the use of the drug.

M. H., chronic suicidal melancholia. The drug produced no effect physiological or otherwise, even in three-fourths-grain doses—pupils very much dilated.

In that of T. B., a well known character to the York police, and formerly a very frequent inhabitant of a palatial dwelling not far from St. George's Fields, the subject of chronic remittent mania of the worst type with delusions of suspicion, and, when off, the most destructive and violent and withal dangerous patient in the house. Three-fourths of a grain administered in one dose produced most marked physiological effects. The thing to be noticed was the extreme depression and loss of power in lower limbs, with great vomiting and want of co-ordinating power over lingual muscles. The patient could not stand after he had the drug two hours, and in thick speech he complained of the "deadly sea-sickness." He was quiet for a fortnight after this dose, but it was only by deceiving him by staining it with Tinct. Lavand. Co. that I could persuade him to take another when again requiring it.

Most of the cases to whom I have given the drug vomit, and it is noticeable that where the best results are obtained the pupil is not much dilated.

In the case of M. W., a very violent woman suffering from chronic mania, three-eighths of a grain produce perfect quiet; in two hours she always vomits and then sleeps quietly for six or eight hours. In this case no permanent benefit has been derived. In a day or two she is as bad as ever. After a single dose the pupils dilate enormously, and remain so for two or even three days.

F. S., a case of chronic remittent mania with violence and great noise and bad language, a single dose cuts short the paroxysms, but does not in any way prevent their return. Thirst, nausea (not vomiting), with dilated pupil, does not produce sleep, but quiets her. This patient is so aware of the good the medicine does her that when she feels an attack coming on she asks me for a dose of it.

I will not multiply cases, as the symptoms in most of them agree in the essential details.

But it should be borne in mind that some patients are very intolerant of the drug, and, in these, small quantities may produce very alarming effects, as in L. T. C.'s case. The conclusions arrived at from comparison of the results obtained in the cases in which I have used the drug are these:—

1st. That a noisy, violent, dangerous, and troublesome lunatic can easily and certainly be rendered calm for some hours and probably, though not certainly, unless the dose be increased, be sent into a profound sleep lasting many hours.

2nd. That I have never seen any ill consequences follow the administration of hyoscyamine.

3rd. That the drug is most useful in acute delirious mania, in the various forms of remittent mania, and it is said also in the congestive (?) stage of G. P.

5th. That in melancholia and where there is much depression with brain irritation, little or no good is gained, and it is in these cases, I am inclined to believe, that great dilatation of pupil is met with.

Many doctors in general practice must frequently be called to cases of acute mania in their early stages, when it is that extreme violence in a private house is so fraught with danger both to the friends as well as to the patient: in such cases I think great benefit would be derived by the administration of a full

dose of hyoscyamine, and even if, as is most likely to the case, the attack is not cut short, yet the patient is calmed and sleeps quietly till other steps can be taken for his after treatment. So again many patients suffering from dementia, who are for the most part harmless and who live with their friends, are now and then liable to attacks of acute brain irritation and become very troublesome, noisy, violent, and dirty. In such as these I think much benefit will be found from this drug given at first in a full dose, three-eighths or three-quarters of a grain, and continued afterwards in one-sixteenth to one-eighth of a grain dose. As a suggestion it might be quite worth trying in delirium tremens.

In reference to the literature of this subject you will find that the doses I use are small. Dr. Sydney Ringer gave one grain dose of pure crystalline hyoscyamine to a case of acute mania. Also one grain of pure atropine with the same result: viz., prolonged sleep and prevention of exhaustion. At Wakefield Dr. Lawson was in the habit of giving one to two, and even has gone as far as three grains, but I look upon these latter doses as poisonous, and if repeated would inevitably end in a coroner's inquest. The good effects can be quite as well gained by the smaller doses, and these can be repeated as often as necessary.

In conclusion I would add that there are certain precautions to be borne in mind having regard to the fact that the drug under consideration is one of the most potent we possess.

Be careful how you give it to patients with degenerate arteries or chronic cardiac disease, or in very old people. Dilute the drug freely, for the reasons I have previously mentioned (though I must confess that in most of my cases vomiting followed, though very freely diluted). Use the preparation fresh, and keep it when not in use in a dark place.

Dr. Lawson also advises that it be not administered in cases of furious mania, where feeding by the pump is likely to be required on account of the dryness produced in throat bronches, and hence the subsequent difficulty in passing the tube. The solution of the crystals can be used hypodermically, but at present I have not been able to give the hypodermic method a trial.

CASES OF DIABETES INSIPIDUS, AND THE TREATMENT FOUND SUCCESSFUL.

BY HENRY KENNEDY, A.B.M.B.,

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WHILST lately reading a lecture by Trousseau, on polytipsia, I was struck with the gloomy picture he gives of the affection, both as regards its termination and treatment. Through the entire lecture indeed the idea is conveyed, that, if not an incurable, it is at least a most intractable disease; and towards the end of it he goes so far as to state that the saccharine diabetes is more hopeful even than the diabetes insipidus. Nor are these views confined to Trousseau alone. In a very able and elaborate work by Dickinson, just published, similar views would seem to be held; and also in the volume of Ziemssen's Cyclopædia which has lately appeared.

Now such experience as I myself have had is strictly opposed to this teaching, and I hope to prove it erroneous before this paper is finished; at any rate, the question is of sufficient consequence to bring under the notice of the profession in the pages of the *Practitioner*.

Before making any remarks, I will proceed to give a few cases of this disease, and the treatment I found successful.

Case I.—A gentleman of forty-five years of age had followed the arduous duties of a general practitioner in England for upwards of twenty years. A legacy then left him made him easy in his circumstances, and he retired from practice, and on his arrival in this country came under my care. He told me that during this entire period, and even some years previously,

he had a morbid thirst, and that he never drank less than four quarts of water in the day, and that it often was more. He attributed the attack in the first instance to cold. He took little or no strong drink, as he fancied it made him worse. The urine passed seemed to be in proportion to the fluid swallowed. It had no trace of either albumen or sugar, and its specific gravity was 1011. It was very light in colour, and had a very faint greenish hue. I told him I had read of cases like his being cured, and if he pleased I would try what could be done: and I spoke in this way, as this was the first case of the kind I had met. He was ordered one drachm of dilute nitric acid in a quart of water, to be used daily. I confess I was much and agreeably surprised to find that literally in the course of eleven days, this gentleman was cured, and though he had subsequently other disease, the morbid thirst never returned. I must say I was not prepared for such a result, and by such simple means; nor could I doubt that it was the acid had effected the cure. The patient himself, a medical man, also confirmed this, stating again and again, that he was being cured by the acid. It must be admitted that the case, though it had lasted for nearly thirty years, was not a severe one; for though the patient did not enjoy robust health, he was still able to perform duties which we know to be of a very arduous kind.

Case II.—A lady, aged thirty-eight, married and a mother, had been getting into bad health for a considerable period before my seeing her. I found it difficult to ascertain how long; but it must have been the greater part of a year. Her symptoms were chiefly referred to the stomach and liver, and these certainly preceded the morbid thirst, which had gradually sprung up, and for which, in particular, I was consulted. My first impression of the case was that it was diabetes mellitus with which I had to deal. The tongue was rough and furred, and her mouth clammy. Her face was sallow, and wasted, and she had lost flesh considerably. There was great depression, and a feeling as if she would die, and the skin was harsh. Her description of the thirst was that she drank forty times a day, and she passed water in proportion to what she drank. Circumstances prevented me ascertaining the state of the urine at my first visit, and when I saw her a few days later I found the specific gravity was

1018, and that it afforded no evidence of either sugar or albumen. It had a shade higher colour too than in the case first given; and the smell was not characteristic of the presence of sugar. On account of her sallow look, she was ordered a few doses of blue pill, and then the dilute nitric acid, in the dose of one drachm daily, was given. This was subsequently increased to two drachms in the day. It is enough to state that this most unpromising case got steadily well. At the end of twelve days she was better, and in five weeks she might be pronounced well, and remained so.

Case III.—A man of twenty-nine was admitted into Dun's Hospital, suffering from inordinate thirst. His face was scorbutic. He stated the thirst had existed for four months, and that he frequently drank ten quarts in the day, though generally speaking the quantity was not so much as this. He did not seem to have suffered materially in his general health, and the only symptom, in addition to the thirst, of which he complained was tympany; which existed to a marked degree, and caused him a good deal of annoyance. His bowels were very sluggish. This case occurred not long after the last, and he was at once put on the nitric acid, which in the dose already spoken of did not seem to alter the thirst. It was then gradually increased to three, four, and finally five drachms in the day; under which the thirst steadily lessened, and there can be little doubt this case would have been finally cured; but unfortunately I was obliged to turn him out of the hospital for misconduct; and I regretted this the more because the man was one of those persons on whom any reasonable experiment could have been carried out. In fact, he seemed to enter into the thing *con amore*. I omitted to state that the specific gravity in this case was at first only 1005, and that it was steadily rising as he got better. I may also state that the tympany was cured in a few days by the use of strychnine.

Case IV.—Rooney, aged 35, admitted to Dun's Hospital, labouring under diabetes insipidus, which he stated was only of five weeks' duration. Yet in this time he had lost flesh seriously; his tongue had a whitish fur on it, and his appetite was very indifferent. The thirst was very great, and he said he drank quarts in the day. The urine had a specific gravity the

same as the last, that is 1005; but no trace of either sugar or albumen. This man was at once put on nitric acid, two drachms in the day; and this was subsequently increased to half an ounce. In one week he was better and avowed it; and now, as his skin was harsh, he was ordered a warm bath. From whatever cause it arose I cannot say; but at this period, that is, when about eight days in hospital, he had a distinct relapse, even when I believe he was taking the acid: and it was somewhat remarkable that after this his recovery was very much slower than at first, and I began to fear the disease would not, in this instance, be conquered. However the thirst finally ceased, the man got flesh, and left the hospital well. At the very last he was given pepsine with good effect. He was six weeks in the hospital.

Case V.—A woman of 35 applied at the Whitworth, Drumcondra, in July, 1876. She was then labouring under symptoms of dyspepsia, and reminded me of having applied some nine months previously, suffering from great thirst, of which she was cured by what she called the sour drink. She told me she had no return of the thirst from that to the present period, and came now to get relief from the stomach troubles. This patient was very fat, and had clear evidence of fatty growth on the heart. Her tongue too at the time she suffered from the thirst was covered with a white fur. I was unable to ascertain the specific gravity of the urine, but it contained neither sugar nor albumen. She was cured of the thirst in about a fortnight, by taking one drachm of the dilute nitric acid in the day.

Such is the experience I have had of this affection; and it seems to me enough has been advanced to prove that, in some cases at least, the disease is curable, and by very simple means. It will have been observed that none of the cases were children; such as others have met with. But this does not affect what has been brought forward by myself.[1] Whether children affected with this morbid thirst would be as readily cured as the cases given I will not take on me to determine. But my impression

[1] In one instance I was consulted about a lady, aged 80, who had had inordinate thirst for two years. In this case one drachm of the acid in the day failed to improve her. There was no sugar in the urine. On the other hand her advanced age, and her not being under my own eye, prevented the treatment being carried out on the same plan as with some of the other cases.

is they would. I think too it may be assumed that, at any rate in some cases, the cause of the thirst cannot be due to organic disease, such as most writers who have spoken of it would seem to attribute it to. It would be difficult to allow that any organic disease of the brain could be so completely cured as occurred in the cases given: and I must express my own conviction that the diseased state of which I have been speaking is entirely functional; even though I might be puzzled to say in what that state consists. Hunger and thirst are not, in their ordinary states, diseased feelings; nor when they become exaggerated are we justified in setting them down to organic disease; even though the morbid feeling may have existed for years.

Whether any other of the mineral acids, such as sulphuric or muriatic, would be equally successful in the treatment of this affection I cannot say. But such is not impossible. The former from its well-known astringent quality might be most useful. The truth is, that, with all the attention which has been, and is now being given to therapeutics, one of its most important principles has been in a measure overlooked. I mean giving a medicine in such doses as will produce its physiological effects; if it have any. In recent times Harley has the credit of having drawn attention to this point in his very admirable work. But I need not tell my readers that it was well known and acted on a century ago; and made the men of that period consummate treaters of disease. And this leads me to speak more particularly of the acid brought under notice in this paper. That it is a most potent medicine admits of no doubt; and that its curative effects are, often at least, only seen when it is given in very full doses is equally certain. Had I not acted on this idea, it is certain I would have failed in some of the cases which have been detailed. It will be recollected that in three of these the doses respectively were two, four, and five drachms in the day. From these doses the specific effects of the acid were very shortly evidenced, and as these are not generally known it will not be out of place to speak of them. About the fourth day the patients say they do not feel quite well; the appetite at the same time failing a little. If the pulse be felt, it will be observed to be fuller than

usual, and headache may be complained of. But what is specially noticed is aching of the jaws and teeth, the patients supposing they have got toothache. But it differs in this respect from common toothache—that it affects both sides. If the gums be now examined they will be observed to be swollen and redder than natural; but though the state resembles the salivation from mercury, I have not seen any ulceration. In two of the cases this state became so marked and the suffering so great, that I was obliged to suspend the use of the acid: and it was very remarkable how rapidly the unpleasant effects then subsided. Two days were sufficient for the purpose; and the fever, for such it was, which the acid had raised in the system, had very nearly disappeared. In this respect there is a very marked contrast between the effects of the nitric acid and mercury; for we know the effects of the latter are much more enduring and depressive. This power of raising a kind of fever in the system, I take to be of great value in therapeutics. Nor is it confined to the medicines named. Iron will cause it, and, if I mistake not, so will arsenic. But probably few will cause it as rapidly and safely as the acid I have brought under notice. Whether this medicine may be found of value in what I cannot but consider the infinitely more serious affection, diabetes mellitus, I cannot take on me to say. In one case where I gave it, it did no good. The patient soon complained of griping, and it had to be given up. In this instance, however, the disease was very far advanced. I can easily understand that at an earlier period, and more particularly if it were an object to lessen the thirst, so often present, the nitric acid might prove very useful.

In the last place, I may observe, I have had no experience which would lead me to think there was any connection between diabetes insipidus, and mellitus. Other observers however have; and it is of course a point which should always be kept in mind.

THE PHYSIOLOGICAL ACTION OF ACONITE.[1]

BY GEORGE HUNTER MACKENZIE, M.D.

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THE following experimental inquiries into the physiological action of aconite were made with the British Pharmacopœia, Fleming's Tincture, and the Aconitia of Messrs. Morson and Sons of London, and T. and H. Smith of London and Edinburgh. For many of the references quoted in the paper I have to express my indebtedness to the highly scientific work on Therapeutics by Professor Wood, of Philadelphia.

I.—ACTION ON THE NERVOUS SYSTEM.

With regard to the action of aconite on the nervous system, Achscharumov, using the alkaloid, concludes that the spinal cord is unaffected, but the only proof he adduces in support of this is the presence of irritability in the nerves of a limb protected by ligature long after it has been lost on those of the unprotected parts. Böhm and Wartmann controvert these statements, and maintain that the nerves and muscles in aconitized animals retain their normal excitability until death. They further conclude that as reflex activity is lost more rapidly than the power of voluntary movement, and as increased reflex action does not occur in frogs poisoned by aconite, when released from the control of the inhibitory centre by section of the cord, that the spinal nervous system is eventually and completely paralysed. Liegors and Hottot assert that aconite acts

[1] For this thesis a gold medal was awarded to the author by the University of Edinburgh. The experiments described in it were performed before the passing of the Act 39 and 40 Vict. c. 77.

by paralysing a perceptive centre above the cord, for they found that tying the abdominal aorta close to its bifurcation, and, in another experiment, shutting off the blood-supply to the cord and spinal nerves, at the same time allowing of its access to the brain, did not retard the development of the usual sensory symptoms. They conclude that the sequence of the paralysis is first, the perceptive centre; secondly, the peripheral extremities of the nerves; and thirdly, the nerve trunks themselves. The same observers also assert that to this paralysis of the perceptive centre is due the loss of sensibility during aconitism, and they also state that after death from aconite the conducting power of the motor nerves is lost much earlier than usual.

How far the above views are in harmony with those now about to be advanced will be seen from the following experiments:—

Experiment I.—A healthy male frog received a subcutaneous injection of $\frac{1}{1000}$ gr. aconitia. Two minutes after injection violent convulsions ensued. Five minutes after injection, on pinching abdomen, he jumped violently. Twenty minutes afterwards a flap of skin was raised from back, and its extreme periphery irritated by galvanism; violent muscular contractions ensued; a companion flap of skin was raised and with one electrode on each flap excessive muscular movements resulted. Forty minutes after injection the flap still maintained its irritability. (An injection of $\frac{1}{500}$ gr. aconitia was now given.) Five minutes after second injection the extreme top of flap only slightly responded, while the animal was crawling about and jumping. Three hours from second injection no muscular contraction ensued on irritation of periphery of flap, but direct galvanic irritation of muscles induced sharp muscular contraction. The sciatic nerve was now exposed and divided: irritation of its peripheral division induced violent contraction of the muscles of the limb, whilst irritation of its central end produced slight movements of the muscles in its immediate vicinity. More frequently, however, no movement resulted from irritation of the central end. In ten minutes more the difference of irritability between the two divisions of the divided nerve was very great, irritation by galvanism of the central end inducing no muscular response, whilst the same degree of irritation applied to

the principal division was followed by sharp muscular contractions. Three-and-a-half hours afterwards irritation of the old, and a newly raised flap, induced no muscular movement unless the electrodes were applied at its base. One electrode near the periphery of each flap was followed by five contractions of the muscles. Twenty-one hours afterwards (on autopsy), neither end of the previously divided sciatic nerve responded to galvanism. On the corresponding nerve of the other limb being exposed and divided, galvanic irritation of its central end induced no muscular response, while the same irritation applied to the peripheral end was followed by feeble muscular contraction. The muscular irritability was great.

Observations on Experiment.—In this experiment it is shown that, on aconitism, the irritability of the peripheral sensory nerves becomes gradually diminished and ultimately extinct. This sensory affection does not immediately follow the administration of the drug, even in poisonous doses, and, as will be seen in future experiments, appears to be preceded by a period of hyper-excitation. It commences at the extreme periphery, and subsequently implicates the afferent nerve-trunks. Whether it extends to the nerve roots and spinal cord will be shown in other experiments.

Experiment II.—A medium-sized healthy male frog was poisoned by the subcutaneous injection into the side of two minims B.P. tinct. aconiti. Ten minutes afterwards, pinching of the skin produced no, or very little, muscular response. Twenty minutes afterwards a large, square flap of skin was raised from back, and galvanic stimulation was applied in the usual way to its extremity. No result was produced, but on moving the electrodes half way towards the base of flap, muscular contractions ensued. (The under surface of this flap did not show abnormal vascularity.) One half-hour after injection galvanic stimulation of flap did not induce muscular contraction except at base, when violent movements ensued. One hour after injection the irritability of skin continues as at last report, eye not sensitive, the animal is moving away voluntarily. It was now beheaded, and in doing so the facial muscles contracted. Its spinal cord was exposed to the extent of about a half inch, and irritated by a weak galvanic current. Violent

general muscular contractions were equally produced by irritation of the anterior and posterior columns of the cord, whilst pinching of the skin produced no muscular movement. One-and-a-half hours after injection the skin gave no evidence of sensibility on cutting through it to expose the sciatic nerve; mechanical and chemical irritation of this nerve induced violent contractions of the muscles of the same limbs and side of trunk. The muscles also contracted on the direct application of mechanical and chemical stimuli. Irritation of the posterior columns of the cord still induced very violent muscular contractions. A limb was amputated, and a flap of skin was raised from it in the same way as on trunk; galvanic stimulation of this flap induced no response until the electrodes were applied to its base, when violent movements of the muscles ensued. When the same flap of skin was closely applied to the subjacent muscles, galvanic irritation of its periphery induced muscular contraction. Three hours after injection galvanic irritation of the anterior columns of the cord induced more muscular movement than of posterior columns; on exposure, however, of a fresh portion of cord, the galvanic irritability of both columns was nearly equal. The irritability of the cord was much less with an electrode on each column. Fifteen hours after injection the irritability of the cord was completely exhausted, whilst irritation of the exposed nerves, both in the attached and amputated limbs, induced contraction of the muscles supplied by them. The irritability of the skin of the amputated limb remained as before, that of the skin of the attached limb had entirely disappeared, even when closely applied to the subjacent muscles, which still retained their contractility.

Observations on Experiment.—This experiment is partly confirmatory of No. I., and also shows that the movements resulting from galvanic irritation of the base of a flap of skin are due to direct conduction to the subjacent muscles, for they occur in an amputated limb. The sensory paralysis does not extend to the spinal cord for, on irritation of the anterior as well as the posterior columns, muscular contractions are readily induced, when the peripheral sensory nerves are quite paralysed. The greater functional activity of the motor, as compared with the sensory nerves, is also evident, for when the latter were com-

pletely paralysed, the power of voluntary movement still remained. The very gradual nature of the onset of the sensory paralysis is indicated by the different degrees of it in the nerves of the amputated and attached limbs.

Experiment III.—A healthy medium-sized male frog received a subcutaneous injection of three minims B.P. tinct. aconiti. Ten minutes afterwards its medulla was divided, and the spinal cord exposed by gently snipping away the arches of several adjoining vertebræ. Three-quarters of an hour after injection, gentle galvanic irritation of the posterior columns induced violent general muscular contractions. The spinal nerve roots were divided ; irritation of the peripheral division of the anterior roots induced sharp muscular contraction of the limbs. Irritation of the central end of a divided posterior root produced slight muscular contraction. The irritability of the central end of the divided posterior root was soon abolished, whereas the irritability of the posterior column of the cord, and of the peripheral division of the divided anterior root, continued for one-and-a-half hours afterwards—until, in fact, the cord was destroyed.

Observations on Experiment.—In the previous experiments it was attempted to show, amongst others, that the peripheral sensory nerves have their excitability diminished, and, during the latter stages of profound aconitism, subsequently abolished, and that this paralysis does not extend to the spinal cord. This non-paralysed condition of the spinal axis is confirmed by the above experiment, which also shows that the posterior nerve roots are affected in a similar way to the nerve trunks.

Experiment IV.—In a chloralized rabbit, weighing two pounds three ounces, poisoned by the subcutaneous injection into the side of $\frac{1}{120}$ grain aconitia, the brain and spinal cord were carefully exposed immediately on the cessation of respiration, and before the heart pulsations had ceased. Irritation by a gentle galvanic current of the surface and substance of brain induced movements of the facial muscles ; irritation of the posterior columns of the cord induced muscular contractions as strong as by the direct application of the electrodes to the muscles.

Observations on Experiment.—Confirmatory of the previous experiments as to the non-paralysation of the spinal cord in aconitism. In reference to the condition of the cerebrum it may

be remarked that, in all his experiments, the author found aconitized animals remain in a state of perfect consciousness until close upon death. In frogs this is universally shown by a strong disinclination on the part of the animal to remain in exposed positions, and is apparent even when the aconitism is very profound. Placed under an experimental bell-jar, the animal invariably attempts to locate itself as far as possible from the observer, and the same disinclination to be watched is one of the features of aconitism in dogs and rabbits. These facts—indicating a considerable amount of power of observation—show that the perceptive functions of the cerebrum are not materially, if at all, impaired. As galvanic and mechanical irritation of the brains of aconitized animals induces muscular contraction, it is equally evident that there is little or no paralysis of the motor centres.

Experiment V.—A large healthy male frog had its medulla divided, and immediately afterward received a subcutaneous injection of two minims B.P. tinct. aconiti. The animal was then laid on a piece of wet lint, placed under an experimental bell-jar, and carefully protected from everything likely to induce reflex action. He lay quiet until twenty minutes after injection, when violent *idiopathic* general tetanic convulsions ensued, the posterior legs being fully extended, the webs expanded like a fan, and the body propelled violently forwards. These convulsions were not readily induced by touching the skin, but ensued on pricking in vicinity of anus—the body being now rigidly arched. One hour after injection, the violent idiopathic convulsions still occur, appearing occasionally as excessive un-symmetrical contractions of the posterior limbs. The eye was not sensitive. The convulsions were not induced by noise or tapping the table on which the animal lay. The body was at this time propelled forward by a most characteristic jerk, the posterior limbs contracting much more markedly and forcibly than the anterior. These spasmodic propulsive efforts supervened mainly without extraneous irritation, though they also could be induced artificially. They were not induced by dropping water on the body, but readily supervened on irritation of anus, chest, abdomen, or web of foot. One leg was sometimes contracted whilst the other was extended. Three-and-a-half-hours after injection

idiopathic and traumatic convulsions continue. Four hours after injection, the idiopathic convulsions have disappeared, whilst they may be induced by extraneous irritation; the local application of dilute sulphuric acid to web of hind-foot was followed by a violent general convulsion, which threw the animal from the table to the floor. Four-and-a-half hours after injection, general convulsive spasms were induced by inserting a wire into the spinal canal.

Observations on Experiment.—This experiment was performed with the view of ascertaining whether the convulsions, which form one of the most prominent symptoms in aconitized frogs, were of spinal origin. That they are in part at least due to spinal hyper-excitation is shown by their increased severity on the cord being relieved from the controlling influence of the inhibitory centre. As will be recognised, the nature of the movements was entirely diverse from the well known reflex muscular actions occurring in decapitated frogs. Whether they were solely owing to increased functional activity of the motor columns of the cord, or whether the peripheral motor apparatus was also stimulated, will be seen from the following experiments:—

Experiment VI.—A healthy, medium-sized frog had its medulla divided, and its aorta ligatured just above its abdominal bifurcation. It was then poisoned by the subcutaneous injection of two minims B.P. tinct. aconiti, and laid under a bell-jar. There was no movement until twelve minutes after injection, when idiopathic tetanic convulsions occurred, as in the previous experiment, and were subsequently repeated. Two hours after injection no convulsions were induced by irritating the posterior limbs, but on pinching the anterior the convulsions occurred, and the left posterior leg was flexed, the right being unmoved. The muscles, on section, showed greater irritability in the anterior (unprotected) than in the posterior (protected) limbs.

Experiment VII.—Healthy male frog, with ligature, had its medulla divided, and immediately afterwards received a subcutaneous injection of two minims tinct. aconiti into its side. During the earlier part of the experiment idiopathic convulsive movements of trunk and extremities ensued, but subsequently

they disappeared from the posterior limbs, these gradually becoming less convulsed, until, one hour from injection, they were quite lax and flaccid, while the muscles of the anterior extremities and trunk were rigidly contracted, and remained so for twenty-four hours after death.

Observations on Experiment.—In the previous experiment it was demonstrated that the convulsions in frogs during aconitism are partly of spinal origin. In the experiments now under review this is confirmed, and it is likewise shown that they are also partly due to augmented peripheral motor irritability, for while they occur in limbs to which access of the poisoned blood was prevented owing to their partly spinal nature, they continue longer, and are more severe in limbs through which the blood circulates freely. In Experiment VII., the degree of muscular irritability present in the poisoned limbs was markedly greater than that of the posterior extremities. The convulsive movements induced on the application of stimuli were not reflex, but due to direct conduction. (See Experiment II.)

Experiment VIII.—Two healthy frogs of equal sizes were taken, and after one had received a poisonous dose of aconite by subcutaneous injection, both had their medullæ divided. Five minutes after injection general muscular tremors were present on the aconitized animal, gradually developing into well-marked spasms, while the non-aconitized frog lay quiet and motionless. One-and-a-quarter hours after injection, the difference in muscular movement between the two was very great; in the poisoned frog most intense spasms of trunk and legs ensuing, and being continued for some time. In it the anterior extremities were so firmly flexed across chest as not to be separable by ordinary efforts on the part of the experimentalist, and the animal could be suspended by them without their becoming extended. The condition of the other frog was quite the reverse. During the experiment, the aconitized nerves and muscles appeared to become more exhausted, and, four hours from the commencement their electrical irritability was decidedly less than in the case of the non-poisoned frog. This result was arrived at on exposing and testing the sciatic nerve. Sixteen hours after experiment the exposed sciatic nerves failed to in-

duce muscular contraction in both frogs, but the muscles acted on direct application of the electrodes. The muscular irritability was greater in the non-aconitized animal. Thirty-eight-and-a-half hours after injection muscular contraction of anterior extremities was readily induced in the aconitized frog by galvanism, while no movement was produced on the non-poisoned animal by a similar application. Forty hours afterwards the brachial nerves were exposed in both animals, and the electrical irritability of nerves and muscles was found nearly equal in both cases. Forty-three hours afterwards the nervous irritability of both had disappeared, while the muscles still acted—much more so in the aconitized than in the non-aconitized animal fifty-one hours afterwards. This difference of muscular irritability continued until its complete abolition in the non-aconitized frog fifty-one hours from period of injection. The muscular irritability remained in the aconitized frog for hours after injection, becoming gradually less until its complete abolition.

Observations on Experiment.—In the above experiment we have evidence of increased motor activity in the aconitized frog, as compared with another to which no poison had been administered. The diminished muscular and motor-nervous irritability supervening on a period of hyper-excitation was evidently due to the exhaustion entailed on the poisoned nerves and muscles during the stage of spasm, as evidenced by their functional activity becoming again greater towards the latter part of the experiment after a period of comparative rest. In this experiment it is also shown that the augmented peripheral motor activity is both muscular and nervous in character.

Experiment IX.—A healthy male frog had its medulla divided and a ligature passed round the upper part of its posterior extremities. On the left leg the artery, nerve, and vein were excluded from the ligature ; on the right leg the nerve alone was free. It was then poisoned by the subcutaneous injection of one minim tinct. aconiti. Thirty minutes after injection, irritation of anus produced most movement in the poisoned leg, the difference being very marked one-and-a-quarter hours after injection. Two hours after injection the nerve of the left (poisoned) limb showed more irritability than

the other, and as was also found to be the case with both nerve muscles two hours and forty minutes after injection. Four hours afterwards this condition was reversed, the nerve and muscle of the non-poisoned limb acting better. Five-and-a-quarter hours after injection, the nerves supplying the gastrocnemii were electrically stimulated and found to be almost equal both in the aconitized and non-aconitized limbs. Seventeen hours after injection the condition was as follows:—Galvanic stimulation of the left (poisoned) limb induced more movements than in the case of the non-aconitized; the same stimulation applied to the poisoned gastrocnemius induced contraction, while no movement succeeded the application of the electrodes to the muscle of the right leg. Twenty-two hours afterwards very slight muscular contraction could be induced in web of poisoned leg; none whatever in right.

Observations on Experiment.—This confirms the previous experiment, and shows that in the earlier stage of aconitism the irritability of the muscles and motor nerves is augmented, that their excessive functional activity induces a period of exhaustion, which disappears, however, if they be allowed time for recuperation.

(*To be continued.*)

ALOPECIA AREATA.

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THIS skin-disease, familiar to, and described by, physicians many centuries ago, has received various appellations. The following are some of the synonyms used by authorities on the subject:—"Area" (Celsus); "Tinea decalvans;" "Porrigo decalvans" (Willan and Bateman); "Phytoalopécie" (Gruby); "Alopecia circumscripta" (Fuchs); "Teigne pelade" (Hardy);[1] Robin alludes to the "Champignon de la Teigne achromateuse;" "Trichosis area" (Gooch); "Alopecia occidentalis" (Wilson); Bazin describes two varieties, "La pelade achromateuse (ancienne teigne achromateuse) et la pelade decalvante ou opticisique (ancienne teigne décalvante);" "Alopecia areata" (Hebra, Neumann, Sauvages).

Celsus[2] describes two varieties of area (*a*), ἀλωπεχία (ἀλώπηξ, a fox) in which the patches spread irregularly. (*b*), ὀφίασις (ὄφις, a serpent). In this form the bare spots commence at the occiput, creeping in a serpentine form round each side of the head to the ears. The former occurring at any age; the latter chiefly in children.

Alopecia areata is essentially slow in its progress, several months and sometimes years elapsing before a large extent of surface is affected. The disks commence usually about the size of a fourpenny piece, increasing to that of the palm of the hand and varying from two to twenty in number. These smooth

[1] *Leçons sur les Maladies de la Peau*, 1860, Hardy.

[2] A. Corn. *Celsi Medicinæ*, liber sextus, cap. iv.

bare ivory-like patches, of a paler colour than the healthy scalp, may coalesce and end in calvities. On closer inspection, minute depressions corresponding to the open mouth of the hair follicles may be detected. There appear to be three stages, as described by Bazin and Hardy. In the first, the affected part has a dull powdered aspect and is accompanied by itching. In the second, the scalp often presents a remarkable form of hypertrophy described by Devergie,[1] which however does not retain the marks of digital pressure as in œdema. In the third stage, the down gradually disappears, leaving the characteristic bare patch.

Etiology.—Regarding the etiology there has been much and varied diversity of opinion. We may divide the supposed causes into intrinsic and extrinsic. (A.) Intrinsic causes—*Age.* The average in the young is from five to twelve years, but it may occur from infancy up to sixty years of age. *Sex.* It is stated by several authors to be more common in females (in my limited experience the cases were about equally divided). *General or constitutional condition.* Debility, menstrual disorders and shock have been mentioned and I believe with correctness (see Cases II. and III.). Among other causes, and they form a large class, may be noticed parturition and previous diseases (acute rheumatism, ascarides, anæmia, fevers, neuralgia, pertussis, rubeola, scarlatina, &c.). *Temperament.* Bazin and others state that the bilious, lympathic, nervous, and sanguineous are equally liable. *Hereditary disposition* has I believe little to do with the disease, but rheumatism and syphilis have been alluded to by some. (B.) Extrinsic causes—*Hygienic influences.* Dampness and exposure to cold by debilitating the constitution may indirectly act as exciting causes. *Deficiency of food* may for a similar reason be included in this class. Of *mental causes,* we may simply mention anxiety, disappointments, grief, and mental emotions (see Cases III. and IV.).

History.[2]—In 1843, M. Gruby read a paper at a meeting of the Académie des Sciences announcing that he had discovered a parasitic fungus in that skin disease generally known under

[1] *Traité pratique des Maladies de la Peau*, 1854, Devergie.

[2] "Recherches sur la Nature, le Siége et le Développement du Porrigo Decalvans ou Phytoalopécie," par M. Gruby (*Comptes Rendus de l'Académie des Sciences*, vol. xvii. 1843).

the designation of porrigo decalvans. The description given by him is exceedingly minute and detailed, and must evidently have been the result of long and careful research. The following is an epitome of his essay:—"Porrigo decalvans is characterised by round patches covered by a white dust, small grey scales, and by falling off of the hair. On submitting this white dust to a microscopical examination we are astonished to find it entirely formed of fungi (cryptogams). On examining individual hairs affected by this disease we observed a large quantity of fungi surrounding them on all sides, forming a true vegetable sheath, extending from the skin from one to three millimetres. These fungi are composed of branches, shafts and sporules. The shafts are of an undulatory form, transparent, and are from $\frac{2}{1000}$ to $\frac{3}{1000}$ millimetres in diameter, contain no molecules, and sometimes bifurcate. The sporules are generally round, some oval, and are from $\frac{1}{1000}$ to $\frac{5}{1000}$ millimetres in diameter. The latter are usually larger, contain no molecules, swell in water, and are transparent. At first the hairs become opaque where the fungi are situated and are easily broken. The surface is glossy and the epithelium loses its brightness. There are neither pustules nor vesicles. This disease should, therefore, be included in the new class, which we term phytoparasites, along with *teigne faveuse*, *phytomentagre*, and *muguet*." Why he named the fungus the microsporon Audouini:—"J'appellerai ces cryptogames, à cause de la petitesse de ces sporules, *microsporon*; et, pour attacher à cette partie nouvelle de la pathologie le nom de ce célèbre académicien qui, par ses belles récherces sur la muscardine, a beaucoup contribué à diriger les esprits sur les plantes parasites qui détruisent les tissus vivants des animaux, je propose le nom de *microsporon Audouini*, pour dénoter les individus végétaux qui constituent le porrigo decalvans." To continue his description:—"The microspores of Audouin thus constitute the affection which we term phytoalopécie. The cryptogams bear an analogy to those constituting the disease phytomentagre, but in the latter they are situated in the follicles and around the hair bulbs; the sporules are much larger and the branches longer." It is generally believed by most English dermatologists that Gruby described the fungus of tinea tonsurans (tricophyton tonsurans) and not that of tinea decalvans. I have frequently

demonstrated the former under the microscope at the Sick Children's Hospital, and can support this theory.

I may mention here, in parenthesis, that I have at present under treatment a boy (æt. 9) attending the Sick Children's Hospital who has three small, but well-defined ivory-like discs of alopecia areata on the scalp and a large patch of tinea tonsurans, about the size of a crown-piece, on the occiput. I asked my friend, Dr. Allan Jamieson, to see the case, when he corroborated me in the diagnosis. In order to verify this we placed two or three hairs depilated from the centre of the latter patch under the microscope, adding a drop of liquor potassæ, when the characteristic spores of the tricophyton were observed at once.

Let us see what some other authorities say on the subject. Bazin[1] believes in the contagiousness of this disease and gives the following description of the fungus:—"La description donnée par M. Gruby est assez exacte, les caractères des spores et des tubes de mycelium sont bien ceux qui appartiennent au microsporon Audouini." Farther on he says—"Dans le microsporon Audouini les spores sont plus petites et moins nombreuses que dans le tricophyton; les tricomata plus nombreux. La disposition du champignon, par rapport à la tige et à la racine du poil, est fort remarquable et bien différente de celle du tricophyton. Ainsi, sur la tige, les spores forment quelquefois des petits groupes isolés ou affectent une disposition racémiforme. La tige elle-même présente de distance en distance des renflements ou nodosités, sphériques ou ovoïdes, constitués par les fibres longitudinales dilatées et incurvées, au travers desquelles on aperçoit des amas de sporules. Dans les intervalles des renflements le poil ne parait pas malade." Hardy also supports the parasitic theory, divides the disease into three stages very similar to those described by Bazin, and alludes to the peculiar appearance of hypertrophy of the skin occurring in the second stage. His description of the fungus also resembles that of Bazin, *i.e.*, "The spores are smaller and less numerous than in the tricophyton, whilst the ramifications of the mycelium are more extensive. The shafts of the hairs present swellings

[1] *Leçons Théoriques et Cliniques sur les Affections Cutanées Parasitaires*, 1858, Bazin.

formed by the spores, and the roots are bulbous, becoming elongated and fusiform."

Mahassez[1] describes a fungus he has observed in this affection slightly differing in some matters of detail from that of Gruby. He and Courréges had invariably found it, but do not venture an opinion as to whether it is the cause or effect of the disease. Robin[2] observes that the cryptogams form a tube round each hair, and that in tricophyton tonsurans they are developed in the roots of the hair. He believes the fungus to be the cause of the disease, adding that its presence deprives the substance of the hair of the materials necessary for its growth, rendering it brittle. Cazenave[3] has clearly mistaken vitiligo (which is really due to absence of pigment in the rete mucosum) for alopecia areata, as may be indicated by a quotation from his work, where an excellent plate of the latter is designated Vitiligo. He says, (page 289) "En revanche, l'auteur anglais avait, sous le nom de Porrigo decalvans, parfaitement décrit l'éruption dont nous avons à nous occuper ici, et qui est le vitiligo siégeant au cuir chevelu. Cependant la confusion faite par Bateman a été admise par un certain nombre de pathologistes; et il y a quelques années à peine, M. Gruby présentait a l'Académie des Sciences un travail qui, sur le porrigo decalvans, s'appliquait bien évidemment au vitiligo."

Is it parasitic? As far as we can judge from a fair study of the literature of this interesting skin-disease, the majority of dermatologists who have of late written on this subject seem to agree that it is non-parasitic. Of the works of twenty-two authors consulted, nine aver that it is parasitic (Bazin, Gruby, Hardy, Hillier, Küchenmeister, Malmsten, Robin, Squire,[4] and Wedl); and thirteen that it is non-parasitic (Bärensprung; Böck,[5] Devergie, Duhring,[6] Hebra,[7] Kohn,[8] Liveing,[9]

[1] "Notes sur le Champignon de la Pelade." L. Mahassez (*Archives de Physiologie*, 1874).

[2] *Histoire Naturelle des Végétaux Parasites*, 1853, Robin.

[3] *Traité des Maladies du Cuir Chevelu*, 1850, Cazenave.

[4] *A Manual of Diseases of the Skin*, 1868, Balmanno Squire.

[5] *Die Hautkrankheiten*, Bärensprung.

[6] *Archiv. für path. Anat.* b. 43, Böck.

[7] *A Practical Treatise on Diseases of the Skin*, 1877, Duhring.

[8] *Lehrbuch der Hautkrankheiten.*

[9] *The Treatment of Skin Diseases*, Liveing.

Moriz, Nayler,[1] Neumann,[2] Scherenberg,[3] Veiel, and Erasmus Wilson).[4] The following occurrence extracted from Hillier's *Handbook of Skin Diseases* published in 1865[5] has frequently been quoted by those who support the parasitic, and hence contagious nature of this affection. "In a large parochial school at Hanwell containing upwards of eleven hundred children of both sexes, forty-three girls, of ages varying from seven to fourteen years, who lived together, were affected. There was no case of the same kind among the infants or boys who occupied a separate part of the building. On inquiry it was ascertained that one girl had been suffering from this disease of the scalp for upwards of two months, and had been allowed freely to associate with the others." Might this outbreak be attributed to have been in some measure due to hysteria? Gibert[6] and Gillette[7] report cases where the disease had apparently spread by contagion. Piffard[8] detected the presence of a fungus in one case, and thinks that Gruby described the fungus in tricophytosis. Squire locates alopecia areata in the class of vegetable parasites, and describes two forms, A, nummulated, slow in progress, and B, serpiginous, rapid. I have made careful and minute inquiry in all the cases that I have seen, to ascertain if the disease has spread to other members of the family, but resulting in the negative. In Case I, every means, if we may so express it, had been employed to propagate the affection, none of the family using any precaution whatever, either during the period antecedent to his appearance at the hospital or during the course of the treatment. No restrictions were made regarding the boy A. S. always wearing his own cap (exchanging caps being a common practice among boys in large day schools). On the other hand, how very contagious are the parasitic diseases such as Tinea favosa and Tinea tonsurans, &c. I remember last winter a mother bringing her whole family of five young

[1] *A Practical and Theoretical Treatise on Diseases of the Skin*, 1874, Nayler.
[2] *Lehrbuch der Hautkrankheiten*, 1873, Neumann.
[3] *Archiv. für path. Anat.* b. 64, Scherenberg.
[4] *On Diseases of the Skin*, Erasmus Wilson.
[5] *Handbook of Skin Diseases*, 1865. Hillier.
[6] *Traité pratique des Maladies de la Peau*, Gibert.
[7] *Gazette Med. de Paris*, t. vii. Gillette.
[8] *An Elementary Treatise on Diseases of the Skin*, 1876, Piffard.

children to the Sick Children's Hospital, all affected with ringworm of the scalp. Thoroughly aware of the nature of the disease, she had employed every means in her power to keep them separate, and stated that she was always careful to wash her hands after attending to the children. I asked her to draw up her sleeves, when a prettily marked ring of tinea circinata was observed about the middle of the right forearm, which speedily disappeared under treatment.

(℞ Ungt. Hydrarg. Nit. ʒi. Ungt. Simplicis ʒvij. Ft. Ungt.)

Microscopical Examination of the Hairs.—Rindfleisch described a nodular swelling situated between the hair-bulb and the narrowest part of the follicle.[1] This swelling he considered to be due to a state of pseudo-hypertrophy of the youngest hair cells, the separation of the hair from the root being caused by minute fat granules. Hebra, on the other hand, maintains that the swelling is due to an inversion of the root-sheath (mechanical), which remains attached to the hairs, but adds that this has been observed in hairs extracted from other diseases, as in pityriasis, &c. Others have described a shrivelled condition of the bulb, caused by disturbed innervation of the papillæ with arrest of pigmentation.

On depilating several hairs from the centre of a patch (see Case I.) and submitting them to a microscopical examination having previously added a drop of liquor potassæ, I noticed the following changes :—The hair-bulb was observed to be attenuated and shrivelled, and embedded in a number of minute cells forming a kind of stroma. These epithelial-like scales differed greatly from the branching filaments and sporules in hairs affected with the tricophyton tonsurans. On examining hairs extracted from other parts of the scalp they presented healthy bulbs widening outwards. The epithelial-like scales are readily soluble in liquor potassæ and ether.

A Neurosis.—I think we may reasonably regard this disease as a *neurosis*. Hebra says it is caused by a lesion of nerve-function with interference in the nutrition and reproduction of the hair (in short, a trophoneurosis). There may be a congenital predisposition to it as in other neuroses. Wilson regards it as a

[1] *Archiv. für Dermatologie und Syphilis*, Rindfleisch.

suspended innervation (a kind of paresis of innervation). This paresis weakens the circulation and suspends nutrition.

It is stated by some authorities to be more frequently unilateral than bilateral. Romberg[1] observed several bald patches develop on the affected side of the scalp of a girl suffering from a trophic facial paralysis.

Treatment.—Finally, a few words anent the *treatment.* As we have already mentioned, this skin affection received attention many centuries ago.

The ancients recommended oleum anthemidis, artemisia absinthium, aqua laurocerosi, oleum anethi (extracted from anethum graveolens), tinctura veratri viridis, delphinum staphisagria, myroxylon peruiferum (benzoic acid, rezin, and essential oil), and a gum rezin prepared from balsamadendron myrrha.

Avicenna ordered leeches. Dioscorides and Galen prescribed gummi labdanum (obtained from cistus creticus), &c. Some time after my cases had been under treatment I referred to Celsus,[2] and was surprised to find how little the treatment adopted at present differed from that recommended by him, (Aulus or Aurelius Cornelius Celsus is supposed to have flourished towards the latter end of the reign of Augustus, or at the commencement of Tiberius, A.D. 14). His admirable and concise method we quote in full:—"Quidam haec generis arcarum scalpello exasperant: quidam illinunt adarentia exaleo, maximamque chartam combustam; quidam resinam terebinthinam cum thapsia inducunt. Sed nihil melius est, quam novacula quotidie radere: quia, cum paulatim summa pellicula excisa est, adaperiuntur pilorum radiculæ. Neque ante oportet desistere, quam frequentem pilum nasci apparuerit. Id autum, quod subinde raditur, illini atramente scriptorio satis est." Bateman[3] used stimulating liniments, and Willan[4] advised repeated shaving of the patches with the application of warm liniments. Macilwain[5] directed careful attention to diet, employed stimulating lotions, and stated that a cure was not possible in less

[1] *Klinische Ergebnisse*, 1846, Romberg.
[2] A. Corn. *Celsi Medicinæ*, liber sextus, cap. iv.
[3] *A Practical Synopsis of Cutaneous Diseases*, 1819, Bateman.
[4] *A Practical Treatise on Porrigo and on Impetigo*, 1814, Willan.
[5] *Clinical Observations on Various Forms of Porrigo*, 1833, Macilwain.

than three months. Rayer[1] offers no suggestion regarding the exciting causes, but records the case of a boy admitted into the Charité in 1827, where a fine down appeared after butter had been rubbed in. He advised this treatment to be continued. Hardy adopts the same treatment as in favus and tinea tonsurans Gruby says the same precautions of isolation, &c., should be taken as in those of the other parasitic diseases, and that our efforts should be directed to destroy this fungus, adding, "qui a résisté jusqu'aujourd'hui à tous les traitements empiriques." The depilation of the hairs, followed by the application of a blister (emplast. lyttæ) or blistering fluid, bichloride of mercury, cantharides lot., friction with ætherial oils in alcoholic solutions, stimulating alkaloids dissolved in oils, &c., with the internal administration of cod-liver oil; steel and tonics have been employed. Hebra's recipe is as follows:—

℞ Acid: Carbol. ʒi
Glycerine ℥i
Alcohol ℥vi. Solve.

Sig. To be rubbed in twice daily with a brush, and the loose and even healthy hairs to be depilated daily.

The following was the mode of treatment carried out in the four cases detailed. In Case I. the patches were ordered to be shaved once a fortnight, and—

℞ Axungiae ʒij
Cerae Albae ʒss.
Balsam: Peruv: ʒij
Ol: Lavandulae ♏x
Ess. Bergamotte ʒp. ft. Ungt.

Sig. To be rubbed in with the palm of the hand each night. (I am indebted to my father for this prescription, which he used with success fully thirty years ago.) And—

℞ Tinct: Ferr: Perch: ʒi.

Sig. Fifteen drops thrice daily.

Careful attention was paid to diet, with as much outdoor exercise as possible. He regularly attended school. In Case II.

[1] *Traité Théorique et Pratique des Maladies de la Peau*, 1835, Rayer.

similar treatment was carried out, with larger doses of steel, the *entire* scalp being shaved once a fortnight. In Cases III. and IV. the bare spots alone were shaved and the ointment assiduously rubbed in. We should recommend, in addition, depilation of the marginal hairs with periodical microscopical examination of the bulbs. Also removal, as far as possible, of supposed exciting and predisposing causes, such as menstrual derangements, anæmia, debility; and, in the youthful, ascarides. Change of scene and even of climate may, if deemed necessary, be resorted to. Avoidance of a damp locality, and attention to general hygienic principles. Cod-liver oil, steel, bark, strychnine, &c., will be found of service. Locally, stimulating lotions and ointments.

Cases.

Case I.—A. S., aged eight, residing at Gorgie, near Edinburgh, came to the Royal Hospital for Sick Children on the 12th of July, 1875, with three bare patches of alopecia areata on the scalp, two situated on the occiput, each about the size of half-a-crown, and a third one, larger posteriorly, about the size of a crown piece, immediately above the nape of the neck.

History.—The father of the boy informed me that his son's general health had been good, but that four months ago he had remarked the bare spots commence and gradually extend till the present. He further stated that the boy slept with him and another son, but that neither of the latter had contracted the disease. They all used the *same comb and brush promiscuously*, and although the boy had regularly attended school, no complaint had been made by the masters or School Board regarding the skin affection.

Treatment.—Ordered the ointment previously indicated and steel internally, also the patches to be shaved once a fortnight. He attended at the hospital again on September 11th, 1875, and on examination one of the patches on the occiput was found to be covered with a fine down one-eighth of an inch in length. He continued attending about once every two months or; so and on examining the patches about the beginning of the following January (1876) found the one last alluded to covered with thick

hair, and the other occipital patch also covered, but not so densely. He ceased attending, as his father considered the affection cured, and I did not see him again till the beginning of last July, when, on careful examination (having referred to notes taken when he first attended), found the occipital patches covered with hair, denser in appearance and of a darker shade than the unaffected hair, which is of a light brown hue. All that remained of the third one was a small area about the size of a shilling, which afforded me an opportunity of making a microscopical examination. I again prescribed the ointment which had been discontinued for many months, and in a few weeks he was completely cured.

The father again assured me that he had never regarded the disease as in the slightest degree contagious, no precautions whatever of isolation having been taken, and no other member of the family had, to use his own words, been infected. The boy, as we have already noticed, continued from the commencement till the cure to regularly attend school, and he had never heard of any of his schoolfellows having been similarly affected.

Case II.—A. C., aged 30, unmarried, a domestic servant, came under observation about the beginning of December, 1874.

History.—Patient states that she has not been in good health for some months past and out of sorts, and about the beginning of last October remarked her hair, which was of a brown hue, coming out in handfuls with the comb, and, on further examination, observed from ten to twelve bare spots like ivory, varying in size from a shilling to half-a-crown, scattered over the scalp.

Treatment.—Patient was ordered to have the ointment as used in Case I., rubbed in thoroughly with the palm of the hand, and to take twenty drops of tinct. ferr. mur. thrice daily. This operation was assiduously performed for her by another maid who shared the same room. She was sent to the country for eight days during December to have a rest and change of scene, also for a couple of days at a time every now and then during the following months. The treatment was rigidly observed, as the patient was naturally anxious to be soon cured. She wore a wig during this period. On inspection two months and a half from the commencement of the period when she first came

under observation, the patches were found to be covered with a black, silky down, which gradually increased till now (May 10, 1875) the hair is three inches in length; one patch, of the size of half a crown, being the most obstinate. Her general health, I may add, had also greatly improved.

Case III.—Mrs. W., aged 37, consulted me at the New Town Dispensary on the 23rd of June, 1875.

History.—Patient states that eight months ago (three months after her confinement) she observed her hair falling out. Had been in an indifferent state of health for some time previously, and had been a good deal harassed about domestic affairs. On examination, four large bare patches, one of the size of the palm of the hand, were observed on the scalp.

Treatment.—The same as in the preceding cases, but the spots alone were shaved. November 2nd, 1875, patches covered with hair a few lines in length. January 6th, 1876, patient states that the patches were shaved again several weeks previously. All the disks are covered with hair which, on depilatory forceps being applied to test their strength, showed considerable powers of resistance.

Case IV.—D. D., aged 26, an artist, consulted me on the 10th of November, 1877, concerning an affection of the scalp which caused him considerable uneasiness.

History.—The patient stated that about the middle of the previous month he noticed a bare spot on the right side of the scalp midway between the forehead and the occiput about the size of a shilling and three weeks later another of similar dimensions on the same side, but close to the forehead, both of which rapidly increased in extent till the present, when they each cover a space corresponding to that of half-a-crown. He had shortly before seeing me taken medical advice, when he was told that his complaint was ringworm and was recommended to use citron ointment. I carefully examined the whole scalp, but was unable to detect any appearance of tinea tonsurans. He further informed me that his general health had recently been below par, that he had been working hard (mentally) and taking his meals at irregular intervals

Treatment.—Similar to the preceding cases, viz., the ointment to be rubbed in each night along with the internal administration

of steel and cod-liver oil and the nude patches to be shaved occasionally. January 14th, 1878, patient informed me that he had strictly followed out the directions advised, and had had the patches shaved four times. Both spots are now covered with hair fully an eighth of an inch in length (apparently of a lighter shade) which resisted traction made by the depilatory forceps *equally* with healthy hairs tested in other parts of the scalp. No other member of the household had been similarly affected.

I may mention in conclusion that his general health had improved considerably and his relief was great, when, after a minute inspection of the parts affected, we assured him that to the best of our belief the disease was not that of ringworm.

Reviews.

The Theory and Practice of Medicine. By John Syer Bristowe, M.D. Lond., F.R.C.P. London: Smith, Elder, and Co., 15 Waterloo Place. 1876.

It appears strange that amidst the superabundance of medical literature with which we are burthened we can scarcely be said to possess a work on medicine from the pen of any English physician, if that by Sir Thomas Watson be excepted. Certainly we possess a portion of Reynolds' System of Medicine, brought into the world after a protracted and apparently very difficult labour, by the united efforts of many. We have also several text-books for students of more or less merit. When, therefore, we received a book from Dr. Bristowe bearing the above title we hoped, apparently not without reason, that this reproach was about to be taken from us, and we anticipated its study with much pleasure. Again, however, were we doomed to disappointment; whatever may be the virtues of Dr. Bristowe's book, and they are not a few, its title surely is scarcely correct. It is not a "Treatise on the Theory and Practice of Medicine" as we understand such a title; it is, however, a very excellent text-book of the science of medicine, and well adapted for students.

Dr. Bristowe acknowledges in his preface all the omissions that we lament, and gives his reasons for them. We cannot but regret the decision he has arrived at, although students may gain by it, yet the profession generally, especially its younger members, are very great losers. All alike would have welcomed a more detailed account of the wide experience and accurate observations of its author, would have gladly followed him through the tangled mazes of many difficult points of diagnosis, and have learnt from so accomplished a master how indeed to practise their art. Yet all these things are conspicuously absent in this work. Personal experiences, original observations, remarks on diagnosis, refinements, and useful hints on treatment are all omitted; and yet it is for these things above all

others that works on medicine are chiefly valued, and from them such books obtain all their distinguishing features, and their readers derive their greatest benefits.

The entire plan of this work, however, clearly indicates that it was written for students, and for them alone. Previous to discussing the diseases of each organ, some account of the anatomy and physiology of the organ is first given, and previous to the clinical account of a disease its pathology is detailed. In fact, so fully has the pathological part of the work been done, that Dr. Bristowe has evidently intended to abrogate the necessity to the student of reading any special work on this science. Space will not permit of a lengthy or detailed criticism of a work of such dimensions; we must content ourselves, therefore, in alluding briefly to some leading points. The language throughout is brief and terse, but the descriptions are comprehensive and complete. The work consists entirely of closely woven facts, no unnecessary details are given, and there is an entire absence of anything like "padding."

One of the peculiarities of Dr. Bristowe's work is the manner in which he has treated skin diseases. A bold effort has been made to shake off the puny details and ridiculously elaborate classifications of authors on this subject, and to place the matter on a sound pathological and rational basis. Thus we find classed together as essentially one disease, erythema, roseola, urticaria, and pityriasis, with their numerous varieties; and again we find lichen and strophulus classed under the head of eczema as identical with it; so also ecthyma with impetigo.

Previous to the discussion of the diseases of the respiratory organs, Dr. Bristowe has given his readers a valuable introduction of thirty pages, in which he gives a most excellent account of the physical examination of the chest and what is to be learnt from it.

Dr. Bristowe has banished croup from his book entirely, only incidentally remarking that one form of diphtheria has been formerly called by this name. In thus treating this much debated subject we think our author has been unduly hard on his opponents, who at least have a right to claim that the question is so far from settled that both sides of it ought to have been stated; and the evidence for and against the identity of the diseases might have been arrayed for the benefit of the student as clearly as has been done, when discussing the question whether erysipeles is a specific fever or a local disease, and in other places.

In treating of phthisis we notice that Dr. Bristowe does not adopt what is perhaps the most fashionable, but we believe the incorrect, view of the present day, namely, that phthisis is essentially due to pneumonic changes, and has no connection

with tubercle except as affording a source of infection, from which it is frequently developed. He teaches, on the other hand, that phthisis originates in tubercle, which may be either acute or chronic, and the tubercle causes pneumonic changes in the surrounding lung tissue. This view among many other supporters found its first propounder in Addison, and its last, very recently, in Charcot.

The recent great advances in our clinical and pathological knowledge of diseases of the nervous system have received very careful attention; and this part of the book is perhaps more admirable than any other. The subject has been treated in a thoroughly scientific and critical manner, and the student cannot fail to obtain from it an extensive and sound knowledge of the most difficult of all branches of medicine. There are, however, a few additions we should gladly see to this section, and chief among these the indications to be obtained by means of the ophthalmoscope. Strange to say, this most important of all recently obtained instrumental aids to diagnosis is scarcely mentioned. Some account of that very common, and often obscure disease, general paralysis of the insane, would be most acceptable: for although, perhaps, strictly speaking it may be considered to belong to psychological medicine, which, for some unknown cause, appears to be banished by common consent from our works on medicine, nevertheless, from its hybrid nature and common occurrence in the wards of our hospitals, it constantly demands the attention of students. Only a few lines are devoted to chronic alcoholism, and although we agree with the author in thinking that too frequently the symptoms occurring in a drunkard are attributed to the alcohol rather than to the diseases which its abuse has given rise to, yet many cases occur to us which it would be difficult to class under any other disease than chronic alcoholism, while pathologists appear fairly agreed as to the gross changes produced in the brain under these circumstances.

We must confess to some disappointment in the method of treatment of dyspepsia, one of Dr. Bristowe's favourite subjects, indeed, he appears to have been overburthened by the wealth of material at his command. An excellent account is first given of the numerous causes which bring about this complaint, the conditions producing it being classed under three chief heads; first, those which "involve the habitual and conscious transgression of obvious sanitary laws;" secondly, "morbid conditions of the stomach itself;" thirdly, "morbid conditions of all those organs which mechanically or physiologically react upon it." The chief symptoms met with in dyspepsia are then enumerated; first, those referable to the stomach, and then those referable to other organs. The author next passes, however, to the treat-

ment of the disease, leaving us entirely in the dark as to the diagnosis of its various causes; indeed, a more bewildering account of this complicated disease cannot well be conceived. The treatment prescribed, however, has at least the recommendation of simplicity, for it consists entirely of the treatment of symptoms. Those indications which are laid down are undoubtedly of value to the student, but we fear also well illustrate the superficial treatment and temporary relief commonly obtained by a hospital out-patient, though not such as we should expect at the hands of Dr. Bristowe. We fully appreciate the difficulty of handling this intricate subject, and we do not wish to condemn our author because we do not agree with him.

Thus far we fear to have made too many complaints of a book that is full of excellence. If this is so, it is because we should like so much more of that which we know the author possesses, large experience, philosophical thought, and diagnostic precision. As a thoroughly scientific and most admirable text-book, we cordially recommend it alike to the student and the practitioner.

Clinic of the Month.

Jaborandi and Hoarseness.—Dr. Eyselein, of Blankenburg, recently administered forty-five grs. of Jaborandi to a lady who was suffering from hoarseness and pain in the neck due to a cold. The leaves were powdered, and a cupful of boiling water poured over them; after standing fifteen minutes, the decoction was sweetened and was administered at eight P.M. After a few minutes the patient experienced an agreeable sensation over the entire body, which was rapidly succeeded by strong, general pulsation, nausea, vomiting, fleeting pains in the abdomen, especially over the region of the bladder, and an outbreak of abundant perspiration. These symptoms were accompanied by great general discomfort and extreme prostration. The perspiration continued for about two hours, and the bed-linen was soon soaked through. Three times during these two hours sudden chills set in, the body, face, and extremities becoming cold for a time. The perspiration was accompanied by a very profuse discharge of saliva; soon after they began, the hoarseness disappeared entirely and did not again return. In consequence of the general lassitude the patient soon fell asleep, but the saliva continued for a long time to run out of the corner of the mouth. The perspiration did not involve the hairy parts of the head. On the next day the patient complained of weakness and lassitude; the left submaxillary gland was somewhat enlarged and tender, the appetite poor, and the saliva thick. This case shows the necessity of caution in the administration of large doses of jaborandi, although the dose was fifteen grs. less than is ordinarily given to an adult at a single dose. The effect on the hoarseness was all that could be desired, but it was attained at the cost of very great discomfort.

Ovariotomy.—In the course of some clinical remarks on ovariotomy made at the Samaritan Hospital, Mr. Spencer Wells detailed the great improvements that had taken place during the last few years in the diagnosis and treatment of ovarian tumours. The operation is now conducted in a light, airy and

quiet room, in which the patient remains alone with her nurse for at least a week after the operation. No visitor is admitted to witness the operation without declaring that he has attended no postmortem nor any case of infectious disease for a week previously. The patient is placed upon a table, lying on her back, warmly clothed, the lower limbs covered with a blanket, the head and shoulders supported by pillows, the knees and hands secured by straps, a perforated india-rubber sheet so applied that only the front of the abdomen is uncovered, and she is asleep under the influence of what Mr. Wells believes to be the safest and best of known anæsthetics, bi-chloride of methylene. All the instruments that can be wanted for the most complicated case are ready and at hand. There must not be, he says, any threading of needles at the last moment. The nurses have a precise number of perfectly pure and soft sponges, and plenty of small fine linen cloths for use before the sponges are wanted. Supposing daylight direct or reflected fails, Mr. Wells has tried various kinds of reflecting lamps when searching for vessels deep in the pelvis; but the most useful of all is the small medical lamp recently introduced by Colin of Paris. All this is ready before visitors come into the room, and they are then requested to observe the most absolute silence. It is quite a common thing for an operation to be completed without a single word having been spoken by the surgeon, the assistants, or the nurses; and if a remark is made by an unwary visitor, it is at once hushed. The incision in the abdominal wall, the stopping of bleeding from superficial vessels by torsion forceps, the division of the peritoneum, the exposure and tapping of the cyst, the separation of adhesions, the management of adhering omentum or intestine, the breaking down of inner septa, and the withdrawal of the tumour from the abdominal cavity, the treatment of the pedicle, the examination of the opposite ovary and uterus, the thorough cleansing of the pelvic and peritoneal cavities, the use of drainage-tubes if required, the closure of the wound, the dressing and bandage,—all are matters of detail of great importance. The patient is carried from the operation table and placed in a warm dry bed. The room is at once cleared and darkened, and when she awakes she finds herself alone with her nurse. Recent changes in the management of the patient after operation have been chiefly in the direction of regulating temperature. Enough opium is given to relieve pain, but not more. The patient is kept warm enough to encourage free action of the skin without being made uncomfortably hot. Food and drink are regulated by the instinctive desire for them. All the nurses are instructed in the use of the thermometer, and they are directed whenever the temperature rises above 100° Fahr. to keep the head cool

by means of the ice-water cap. If the skin is dry, very small doses of aconite are given frequently (half a drop of the tincture every half-hour). It is only in the rare exceptional cases of septicæmia, septic peritonitis, or pyæmic fever that large doses of quinine or of salicylate of soda are thought of. In some few cases bleeding from the arm has been necessary, but as a rule the patients are let alone after the operation and they get well. (*Medical Times and Gazette*, Jan. 5, 1878.)

On the Treatment of Wounds.—Mr. Philip Cowen has recently written a paper on the simple methods of treating wounds, in which he states that, armed with some thick, well-made tincture of benzoin, ligatures, iron wire sutures, compresses of lint, cotton wool, bandages, simple ointment, and water, the practitioner can most successfully treat all wounds that may come under his notice, rapidly and with the almost certain hope that most of them will unite by adhesion. The treatment of a fresh wound is essentially different from that of a non-recent wound, *i.e.* those that have been inflicted twenty-four hours and upwards. A fresh wound may be sealed up, whereas in wounds after a few hours, certain decomposing products, however slight, are found, viz., ill-smelling serum, decomposing blood, pus, &c., from within, or caused by germs from without, which render sealing-up an absurd and dangerous procedure, resulting in one or other form of blood-poisoning, Thus there is at once a natural distinction of great importance in treatment—seal up fresh wounds, ventilate other wounds. The most simple application for sealing up wounds is the old-fashioned tincture of benzoin, and it is the most successful. By it nearly all fresh wounds heal rapidly, while they do not do so under watery and fatty dressings. Tincture of benzoin has a remarkable property of uniting tissues and combining with blood. It is antiseptic, and, assisted by cotton-wool pads of lint and firm bandaging, will arrest hæmorrhage from all vessels less in size than the radial artery. Non-recent wounds which suppurate it is not desirable to heal by adhesion. The most important item in the treatment of these is ventilation with as pure air as possible. None but the most evil results follow the application of waterproof materials such as oiled silk and gutta-percha tissue over the dressings. Such wounds invariably stink and slough; the wound is made unduly hot, products of decomposition are retained, the surface has a greyish grumous aspect and loses substance daily. A simple piece of lint or muslin covered by cerate, or dipped in lotions of Condy's fluid (1 to 40), or tincture of myrrh and water (1 to 20), spirit and water or weak carbolic acid lotion (1 to 60), with just a layer of bandage to retain the dressing in

its place, is all that is necessary, save a daily syringing and washing with warm Condy's fluid and water. Soothe, cool, ventilate; if it be desirable to keep the wound moist let it be wetted as often as necessary, avoiding the use of waterproof coverings. Should erysipelas, swelling, pyæmia, blood-poisoning, or symptoms of thrombosis arise, freely foment and apply poultices as hot as can be borne. Mineral acids or tincture of iron may be given in free doses internally. Cleanliness in the vessels used for soaking wounds is very necessary, and rag which can be burnt directly should be used instead of sponge. The simplest dressing of all to wounds—leaving them alone—is at times one of the most useful. A large suppurating surface after a burn with flabby and juicy granulation will dry up, its surface become glazed, and rapid healing result, by leaving it exposed to the air for a few hours daily." (*Med. Examiner*, No. 20, 1877.)

Surgery of the Face.—Mr. Francis Mason, in the Lettsonian Lectures delivered before the Medical Society, treats of the face, and, as a preliminary, discusses the pathology and treatment of the chief cutaneous diseases to which the skin of that part of the body is liable. Speaking of acne indurata, he remarks it is best not to wash the face more frequently than is absolutely necessary, and to use warm water alone, without soap; the parts being subsequently dried with a soft towel. In regard to boils and carbuncles, he thinks the best treatment is to leave them to nature, merely advising the free application of warm water dressing. By this mode of treatment the surrounding parts become thoroughly relaxed, and the inflammatory products are more readily carried off. Strumous abscesses should be treated by making a small opening in a depending position, which allows the contents to exude spontaneously. If, in addition, a pad of lint of suitable size be placed over the abscess, a re-accumulation of the matter is obviated. Such also frequently lead to fistulæ. The best mode of removing cystic tumours is to transfix them, by which method a free opening is made into the cyst cavity, and the two halves can easily be dissected out. (*Lancet*, Jan. 12, 1878.)

Treatment of Postpartum Hæmorrhage by the Injection of Hot Water into the Uterus.—Dr. Lombe Atthill observes in a paper read before the Dublin Obstetrical Society on the 8th December, 1877, that postpartum hæmorrhage is of such frequent occurrence, and so often assumes an alarming character, that any method of checking it which combines efficiency with ease of application and safety to the patient is certain to be hailed with satisfaction by practitioners. The most efficient means at our command for the arrest of

flooding after labour is the injection of a styptic, such as the solution of the perchloride of iron, into the uterus. This is a procedure which he has no hesitation in recommending, notwithstanding the alleged danger attending it; but the perchloride may not always be at hand when the emergency arises. The introduction of the hand into the uterus, which is sometimes very effective, is, he thinks, certainly not free from danger, and is by no means reliable in its results. The routine treatment by cold, whether applied to the surface or injected into the uterus, requires for its success that the patient should be possessed of sufficient vitality to ensure reaction; it is positively injurious when the patient has been debilitated by previous disease, is worn out by protracted suffering, or exhausted by frequent, though it may be small, losses of blood. Dr. Atthill states that, as far as his personal experience goes, the apparently alarming losses of blood which sometimes occur immediately after the birth of the child, or expulsion of the placenta, are not likely to terminate fatally; they can in general be at once arrested by the application of steady pressure over the fundus of the uterus, and by the use of cold; but the hæmorrhage to be dreaded is that in which the blood trickles away in a little, never-ceasing stream, the uterus relaxing and contracting alternately. This form, of which he has seen several fatal cases, is most common in debilitated women, and in such cases cold is in general either useless or injurious. Dr. Atthill gives a case of hæmorrhage of this kind when the "usual means" had been applied without success, and in which, on being sent for, he arrested the hæmorrhage at once by removing the wet sheets, applying warm jars to the extremities, and friction to the uterus. Lately, having been called to another case, he resolved to inject hot water: the tube of the syringe was passed right up to the fundus of the uterus, and water at a temperature of 110° F. was freely injected, the hand being at the same time kept over the fundus. The uterus contracted freely under it, exactly as it would have closed had he employed the perchloride of iron. In a very short space of time, probably before he had injected more than a pint of the hot water, the fluid ran nearly clear from the vagina, the pulse improved to a marked extent, and he ceased to inject any more. After a short time a binder was applied, and the patient made a good and rapid recovery. In another case, the hæmorrhage, after delivery, was complicated with the presence of a fibrous tumour in the walls of the uterus, but this did not deter him from proceeding with the injection, which both stopped the bleeding and removed the pain, that had previously been severe. The plan of injecting hot water under these circumstances appears to have been first suggested by Dr. Windelband. Dr. Atthill concludes by saying that in hot water we have at once

a safe and efficient remedy for postpartum hæmorrhage, but its advantages are not confined to this, for it may be used to check hæmorrhage occurring in cases of chronic disease of the uterus, and after operations. Though 110° F. is the temperature named, it is not necessary that this should be precise. Water in which the hand can be kept without discomfort may with safety be employed, but it must be remembered that if the temperature be allowed to fall much under 110° disappointment will certainly follow; equally will the injection be nearly useless if the tube of the syringe be not passed right up to the fundus of the uterus, or at least be introduced fairly within its cavity. (*Dublin Med. Journal*, Jan. 1878.)

Atropia in Epilepsy.—A trial has been made in Dr. Leidesdorf's clinic of the continued use of *small* doses of atropia in cases of epilepsy. It was found to act beneficially if given to the extent of 1-70th grain of the sulphate daily. The trial was made in consequence of the accepted fact that small doses diminish the action of the reflex nerve-centres, while large doses produce an opposite effect. Cases of motor epilepsy of not long standing recovered rapidly, and some old cases complicated with mental derangement also got well while taking the drug. In other cases the attacks were rendered less frequent. The observation was confirmed by experiments on animals. (*Med. Exam.*, No. 34, 1877.)

The Treatment of Lichen.—In a recent clinical lecture at the Saint Louis Hospital, M. Laillier laid down the following rules for the treatment of lichen:—In the first place, in order to proceed methodically, the cause must be studied. There is a lichen the causes of which are external, or an artificial lichen. The lichen, the causes of which are internal, is the most interesting to study, and it may be syphilitic, scrofulous, arthritic, or herpetic. *A.* Syphilitic lichen appears in three forms. 1. A papular, lenticular syphilide, consisting of coppery papules, covered with scales, and surrounded by a zone. 2. A papular, miliary, diffuse syphilide; this is especially met with in scrofulous syphilitic patients. 3. Circumscribed syphilitic lichen; this appears in the form of groups of lenticular papules; but sometimes these groups are surrounded by a zone of miliary lichen, whence the name "corymbose syphilide." These three forms are cured by resolution. *B.* The scrofulous form is the most common. *C.* Arthritic lichen comprehends circumscribed lichen and livid lichen. *D.* In herpetic lichen there is diffusion of the eruption. The treatment is general or local. The general treatment is that of the diathesis. The local treatment is very complicated. In syphilitic lichen, M. Laillier prescribes an ointment of iodide of potassium, or of biniodide of mercury, of

1 part in 50 or 100. In lichen agrius M. Laillier advises enveloping with caoutchouc as in eczema: with this he prescribes douches, vapour baths, and inunction with glycerole of starch, which succeeds better than in eczema. When the lichen is situated about the anus or perinæum, M. Laillier employs an ointment of oxide of zinc. To alleviate the intolerable itching of this form, the author advises lotions of warm water, or at any rate warm baths, every day to the affected part. He does not recommend oil of cade in these affections. With respect to hydro-mineral treatment, the patient should be sent to those waters indicated by the diathesis. (*Med. Exam.*, No. 43.)

Extracts from British and Foreign Journals.

On the Radical Treatment of Uterine Cancer.—Prof Goodell, of the University of Pennsylvania, believes that it is not only often impossible, but is clinically needless, to distinguish *intra vitam* the various kinds of uterine cancer. He believes that cancer of the uterus is of all cancers the least prone to infect the system; its victims die not so much from specific systemic poisoning, and from transference to distant organs, as from septicæmia, from embolism, and from the exhaustion induced by pain, sleeplessness, and the bloody or serous fluxes. In cancer of the cervix the indications are either to eradicate the disease, or failing in this, to check the excessive discharges, to correct the fœtor, and to allay the pain, and thus to prolong life. To effect this he advises removal of the cervix either by the écraseur or galvanic cautery. When the entire cancerous mass is not removed by these means, the remaining outgrowths and the underlying infiltrated tissues must be dug out with the finger-nails, scraped off with Simon's spoons, or snipped off with scissors. The resulting deep and funnel-shaped cavity must next be cauterized with fuming nitric acid or the hot iron. This may be done either at the time of the operation or after an interval of a week or so. During the operation, if scraping be needful, the hæmorrhage is usually quite free, but in Prof. Goodell's experience it has always yielded to an injection of one part of Monsel's solution to three of water, followed by a sponge tampon lightly packed into the funnel-shaped pit. After the operation there is sharp fever for four and twenty hours or more. On the third or fourth day the discharges sometimes become offensive, and continue so for several days. After the scraping process the stench is invariably overpowering, and must be met by injections of a solution of permanganate of potash, and by large doses of quinine to guard against blood-poisoning. In all cases Prof. Goodell enforces sexual abstinence, and orders the patients iron and bichloride of mercury as a tonic, arsenic to repress the tendency to reproduction of the new growth, and ergot to diminish the supply of the blood to the uterus.

He has now operated on thirteen cases, in all of which life was lengthened and made bearable; in one instance, as he believes, saved for good. The hæmorrhages were stayed, the putrid discharges checked, the pains allayed, and the appetite restored, and bed-ridden patients were enabled to get up and resume their household avocations. Even when the womb was fixed by the extension of the disease to parts beyond operative reach, much was gained by removing all of the cancer that could be reached. The complexion invariably cleared up after the operation, and this fact leads Prof. Goodell to think that the so-called cancerous cachexia is due not to a cancerous diathesis, but to absorption from a local cancerous deposit. Injury to the peritoneum cannot always be avoided during the operation. Karl Braun, however, does not hesitate to include a portion of the peritoneum in order that the hot wire may pass through perfectly healthy tissue. He says he has repeatedly in this way opened into the peritoneal cavity without harm to the patients. In one case, while scraping with the finger-nails, Prof. Goodell opened into Douglas's cul-de-sac. No vaginal injections were used, no untoward symptoms arose. (*Med. and Surg. Reporter*, March 10th, and *Canada Lancet*, p. 298.)

On the Experimental Use of Amyl Nitrite in Pertussis.—In a report read before the Medical Society of the State of New York, Dr. George Bayles commences by the following quotation:—"Dr. Sawarowsky writes to a St. Petersburg medical journal recommending the inhalation of a mixture containing ʒj of chloroform and three drops of nitrite of amyl in whooping cough. Besides this he administers for three days, at intervals of two hours, a powder composed of the cyanide of silver and pure argil or alumina—one-twelfth of a grain of the former and three grains of the latter. He likewise advises prohibiting the use of articles of food and drink that are hot, or quite warm. The writer says that under this plan of treatment the most obstinate cases have yielded within a few days." At the time of making his experiments Dr. Bayles had no idea that the value of this agent had been tested in whooping cough. Until comparatively recently, he observes, nothing in medical science had been discovered sufficiently potent either to avert the invasion or abridge the progress, in any appreciable degree, of this distressing malady. To abate the violence of the chief symptoms ever so slightly, will be to effect an excellent result, as nothing but the hard exhausting cough need be regarded either as an element of danger, or of special inconvenience in this disease. The complications which sometimes arise in certain of the unfavourable cases of pertussis are always induced and sustained by this one superdominant symptom, whatever may have been

the predisposing systemic conditions. In quinine there appears to be a real antidotal action to the specific root element of this disease (whatever that may be); therefore, an undercurrent of quinine, so to speak, kept up throughout the progress of the disease, cannot but be of advantage. Chloral is a sedative nervine of very efficient action, and beneficial in an eminent degree where nervous excitement is intensified by the apprehension of an approaching paroxysm of coughing. This agent, therefore, proves most serviceable in the cases of the elder patients. Amyl comes in as a direct anticipatory measure for the relief of the cough as to its frequency, and also its pacification as to paroxysmal energy. Dr. Bayles then gives a series of ten cases which show that the nitrite of amyl is able to allay the characteristic and most distressing symptoms of whooping cough; that no antagonism exists between it and at least one approved and valuable remedy, viz. quinine; and that it is not necessary to suspend the use of amyl at any time in consequence of danger arising from the too powerful action of any of its physiological properties. Dr. Bayles has seen satisfactory notes of the employment of nitrite of amyl in cephalalgia, hemicrania, facial neuralgia, the cough from congestion of the fauces and the whole respiratory tract belonging to acute bronchitis, in trismus nascentium, hysterical convulsions, cardialgia, gastralgia, colic, cholera, dysmenorrhœa, puerperal convulsions, lead colic, hiccough that resisted all other treatment, blepharospasmus, various forms of spasm, cold stage of intermittents, sea-sickness, chloroform narcosis, &c. In all these cases the action has been most favourable and worthy of repetition. (*Virginia Medical Monthly*, August, 1877).

Ozæna and its Treatment.—Dr. Rouge read to the Congrès International des Sciences Medicales, held at Geneva, a paper on Ozæna, in which he stated that, as a rule, the disease originates in suppuration of the nasal fossæ, or the sinuses connected with them, as the frontal, ethemoidal, sphenoidal, and the antrum. The suppuration appears to be always due to some alteration of the bones. The larger the extent of bone affected, the greater the degree of ozæna, the fœtidity of the breath being increased by the putrefaction of the gums. The treatment should consist in frequent washing out, and frequent injections of the nasal fossæ; insufflation of astringent, caustic, and disinfectant powders, cauterisation with solid chemical caustics, the employment of the galvano-cautery, extraction of sequestra, drainage of the sinuses. To effect these proceedings the nose should be detached by the sublabial operation, which permits all the parts to be examined, and the extirpation of the necrosed parts. No cicatrix is perceptible after the operation. In addition general treatment

should be attended to. (*Archives Générales de Médecine*, Nov., 1877.)

Puerperal Convulsions.—Dr. Bahnson states that amongst two hundred births he has witnessed fourteen cases of puerperal convulsions. One in the seventh month miscarried, had convulsions, and recovered. One in the eighth month recovered from eclampsia without miscarriage to die of a renewed onset five weeks later. Of eleven more attacked by convulsions at the end of gestation—five before and during the first stage of labour—one died without apparent dilatation of the os uteri, five during the second stage; one at the termination, and one eight weeks after parturition. With the exception of the last the patients were primiparæ. All were well-formed women, and in all the occiput of the child presented anteriorly. Six mothers and twelve infants died. In many of the cases an unusual appetite was noted. Dr. Bahnson believes this symptom is due to an excessive waste of tissue, due to some catalytic action going on in the economy, and that the explanation of this may be that the effort to supply nourishment to the fœtus in utero stimulates to excess in such cases the ordinary metamorphosis of blood-producing tissues. It is notorious, he observed, that the blood of pregnant women is overcharged with fibrine—an acknowledged excrementitious product. Consequently they in whom this metamorphosis goes on to excess, although in appearance plethoric, are not so in reality, except as to quantity of blood. Their blood, loaded with fibrine, and possibly other products of disintegration, is thick and viscid. The circulation is sluggish, and the kidneys and bowels perform their work but imperfectly, hence general or gradual œdema is present. In regard to the treatment of puerperal convulsions, Dr. Bahnson prescribes iron, not only for its ultimate effect on the blood-producing tissues, but also to relieve the morbid appetite, which it effectually does if given a short time before meals, or whenever there is a craving for food at unusual hours. He is an advocate for the use of the lancet, and considers that one large bleeding is better than repeated abstraction of small amounts of blood. With this he administers from three to five drops of croton oil, and then depends on chloroform, ether, morphia, and chloral. He directs attention to the singular effects of change of position in arresting convulsions, turning the patient on the side having a beneficial effect, whilst when she rolled over to the supine position they immediately recurred; as Dr. F. J. Brown noticed in the *Practitioner* (April, 1876). He refers also to the use of benzoic acid in connection with scanty urine, a remedy that was long ago recommended by Frerichs, when albumen was present with deficiency of urea, or in suppression with the idea of

preventing the absorption of urea. (*Virginia Medical Monthly*, vol. iv., No. 7, 1877.)

The Physiological Action of Nitropentan.—G. Schadow has made experiments on the effects of the inhalation of the vapours of nitropentan in man, dogs, and cats. Nitropentan is isomeric with nitrite of amyl ($C_5H_{12}NO_2$) In man the respiration of eighteen drops was continued for five and a half minutes; the frequency of the pulse remained unaltered, as well as the amplitude of the waves when a tracing was taken; in only one instance was the latter increased and in one only, out of nine experiments on different persons, was it augmented. No effect was observed on the sensorium or on the colour of the face. The sphygmographic tracings presented nothing unusual. In dogs and cats, when the inhalations were continued from eight minutes to one hour, convulsions began to occur which gradually increased in intensity till they passed into true epilepsy. Coincidently the peristaltic action of the intestines was rendered very active, and evacuation of the fæces occurred. The urine was also discharged and there was sometimes very profuse flow of saliva. The pupils were dilated. In animals otherwise uninjured, the frequency of the pulse seemed to be somewhat diminished; but if the vagi nerves were divided or their terminations paralysed, or if with intact vagi the pulse frequency was increased by the prior or coincident administration of amyl-nitrite, the action of nitropentan was in this respect *nil.* During the convulsions the blood pressure of course rose. After the cessation of the convulsions, or if these did not come on, the blood pressure usually fell. The vessels of the pia mater underwent no change during the inhalation. The inhalation for from two to five minutes of nitroæthan (an isomer of athyl-nitrite) produced no effect in six experiments upon the frequency of the pulse. (*Archiv f. exp. Pathol.* B. vi. p. 194.)

Useful Prescriptions.—Dr. Lewis Smith, the Clinical Professor of Diseases of Children in the Bellevue Hospital Medical College, New York, says that many years ago he saw some useful papers with this title, giving prescriptions which he has continued to employ ever since with more or less modification, and, he thinks, that what has proved serviceable to himself may be so to others. He has found the following plan successful in a large number of cases of *indigestion* which result from functional disturbance:—Bismuthi subcarbonatis, ʒij; pepsini vel lactopeptini, ʒjss, misce. To be made into twelve wafers, one to be taken before each meal, and twenty drops of the following in wine or water after each meal:—℥ Tincture nucis vomicæ, acidi muriatici diluti, of each one ounce. In cases attended by constipation and eructation of gas, the following will be found

useful:—℞ Pulveris carbon. ligni.; magnesiæ carb. āā ʒj. pulveris rhei ʒij ad. ʒss, misce. Half a teaspoonful to one teaspoonful to be taken in simple syrup, or any convenient vehicle, three times a day. Diet, of course, should be attended to. In habitual *constipation* of the adult the following pill will be found very efficient, whilst its purgative effect is not very severe, and is commonly without pain:—℞ Extracti belladonnæ gr. iii., ext. nucis vomicæ gr. vi., podophyllin. gr. vi.-ix., ext. aloes gr. xviii. misce; divide in pil. xviii. One to be taken for a dose. In infants, constipation is better treated with enemata of warm water than by purgatives, and a little oatmeal in the food will sometimes relieve it. He also recommends frictions with cod-liver oil over the abdomen. In *infantile diarrhœa*, the following prescriptions have been largely and successfully employed in the New York Infant Asylum:—Tinct. opii. gtt. xvi., bismuthi subnitrat ʒij., syr. simplicis ʒss., mist. cretæ ʒiss misce. Give one teaspoonful every three hours to a child of one year. Tinct. opii. gtt. xvi., bismuthi subnitratis ʒij, pepsini vel. lactopeptini ʒiss. Syrupi zingiberis, aquæ menthæ piperitæ āā ʒj. To be administered in the same dose as the foregoing. Vomiting is often a prominent symptom of this malady; it may be controlled by lime-water given in an equal quantity of milk, to which double or treble as many drops of whisky or brandy are added as the infant is months old. A few drops of chloroform in cold water will also sometimes control the vomiting; and again one-tenth to one-sixth of a drop of tincture of ipecacuanha in a teaspoonful of water, given to the infant every hour, is often very effective. An efficient substitute for large doses of quinine is the following prescription, known as the "*Indian cholagogue*":—Quiniæ sulphat ʒij, pulv. cinchonæ ʒiv., tinct. sanguinaria sat. ʒiv, syr. simplicis Oj, strychniæ gr. iij, acid. sulphur. aromat. ʒij, spirit. vini ʒij, aquæ puræ ʒij, ol. Gualtheriæ, ol. menth. pip. āā ʒj, misce. The bitterness of the sulphate of quina or cinchona is well concealed in the following "*elixir adjuvans*":—Cort. aurantii ʒij, pulv. semin. coriandri, pulv. semin. carui āā ʒij, pulv. cort. pruni Virginiani ʒiv, pulv. rad. glycyrrhizæ ʒvi, macera in alcohol part i., aquæ partes iiss., ad. O.v., adde. syr. simplic, aquæ āā Oijss. This may be given to children who would otherwise refuse it on account of the bitterness of the quinine. (*Virginian Medical Monthly*, June, 1877.)

Carron Oil Liniment in the Treatment of Fissure of the Rectum.—Trousseau, in his Clinical Lectures, has passed in review all the ordinary methods of treatment of this troublesome and painful disease, and regards as the most successful, injections of Ratanhy, according to a formula he has adopted.

Even this, however, is not always successful, and Dr. Carrére states that in a case where this, as well as many other measures, failed, he obtained a successful result by using the carron oil liniment. With a small pledget of lint he bathed the fissure three or four times a day, and at night introduced a little suppository, thoroughly moistened with the fluid, into the anus. A cure was effected in eight days. (*La Province Médicale*, No. 5, 1877.)

Employment of Catgut to arrest Hæmorrhage from a Bone.—Dr. Riedinger, having performed amputation of a thigh, was troubled with the hæmorrhage that proceeded from the bone. As he was proposing to treat it on Lister's plan, and in the hopes of immediate union, it became necessary to stop the bleeding; direct compression proved fruitless, though it was continued for some time. At length he bethought him that catgut is absorbed when introduced in the living tissues, and he immediately cut off several ends which he introduced successively into the bleeding orifice. The flow of blood ceased at once, and no further difficulty was experienced. In order to study the manner in which catgut behaves under these circumstances, Dr. Riedinger amputated the leg of a dog and introduced a No. 3 thread into the medullary canal of the fibula. The wound was closed, and healed by first intention. At the end of fifteen days the dog was killed, and on examination not the least trace of the catgut could be found. A second and larger dog was subjected to the same operation. This being done the compact substance of the tibia was perforated with an awl, and a piece of catgut introduced into the medullary cavity. Immediate reunion followed closing of the wound, and the animal was killed in three weeks. The wound made by the instrument was contracted, but not the slightest trace of the catgut could be discovered either in it or in the medullary cavity. (*Gazette Médicale de Strasbourg*, No. 9, 1877.)

Notes and Queries.

NOTES AND CORRESPONDENCE.

The A 1 Cod-liver Oil.—A sample of cod-liver oil bearing this designation has been sent to us by Messrs. Southall Bros. and Barclay, Birmingham. It is of a pale yellow colour, and exceedingly bland, agreeable taste. When tested with sulphuric action it gives a clearer purple colour than most other oils we have tried, so that we have no doubt that it is a very pure oil. The sample we have examined certainly has a very good claim to the name A 1 which it bears.

Jaborandi and Pilocarpin.—We have received from Mr. Wm. Martindale a Liquor Jaborandi, one fluid ounce of which equals one ounce of the leaves. This is intended for internal administration in doses of ten to twenty minims. Another preparation, even more convenient, is his hypodermic injection of nitrate of pilocarpin, the active principle of the leaves. This contains one grain in twenty minims, and may be used in dropsy from Bright's disease or wherever it is wished to obtain the action of jaborandi without giving it by the stomach.

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*** Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Ballière, of King William Street, Charing Cross.

Department of Public Health.

PNEUMONIA, CONSIDERED IN CERTAIN ETIOLOGICAL RELATIONS AND WITH REFERENCE TO EPIDEMIOLOGY AND PREVENTIVE MEDICINE.[1]

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Pneumonia is not specially a disease of cold weather or of cold climates. In England the proportion of deaths from pneumonia to 1,000 deaths from all causes is from 30 to 50; in the year 1875 it was exactly 50; in Iceland this proportion is said to be as low as 13; for, as has been shown by Professor Hirsch and Dr. W. Ziemssen of Berlin, pneumonia occurs with much less proportional frequency in cold, sparsely peopled districts than in warmer and more populated countries. Ziemssen, in 1858, stated that "the amount of the mean fluctuation in the mortality from pneumonia is in inverse ratio to the density of the population." This is noticeable also in the mortality from phthisis.

Twelve years ago, while investigating the etiology of croup, I had occasion to point out the correspondence existing between the seasonal prevalence of that disease with laryngitis and pneumonia, and the strong contrast observable between these diseases and bronchitis as to the time of year at which each is most fatal.[2] Dr. Octavius Sturges, in the St. George's

[1] A paper read before the Epidemiological Society, 9th January, 1878.

[2] *A System of Medicine*, edited by J. Russell Reynolds, M.D. Macmillan, London, 1866. Vol. i. first edition, article "Croup," pp. 242-244. Second edition, 1870, pp. 76, 78-9. See also article "Pneumonia," by Dr. Wilson Fox, in vol. iii. 1870.

Hospital Reports, vol. v. 1870, in an admirable essay on the Etiology of Pneumonia, very clearly demonstrates this difference for pneumonia and bronchitis; he remarks that it is not unusual at midsummer for the mortality from pneumonia to exceed that from bronchitis, and that in the cold weather of November, "the bronchitis rate rises in a greater degree than the pneumonia rate, and the maximum of difference for the two is obtained about January or February."

In the *Dublin Journal of Medical Sciences* for May 1875, Dr. Grimshaw and Dr. J. W. Moore give a valuable contribution to this subject. In a table compiled from the Returns of the Registrar-General for Ireland, the number of deaths from bronchitis and pneumonia, in the nine years ending 1873, are entered according to the season of the year in which they occurred. For every 100 deaths the average for each quarter of the year is :—

Bronchitis . .	44·5	21·9	9·7	23·9
Pneumonia . .	31·7	26·6	16·2	25·5

An analysis of the deaths from these two diseases in the Paris hospitals for the seven years 1868 to 1874, from figures to be found in *L'Union Médicale*, made by these authors, gives a very similar result, the proportion of deaths for each quarter being for :—

Bronchitis . . .	34·7	25·8	13·2	26·3
Pneumonia . . .	30·8	28·4	18·3	22·5

The London returns closely correspond, except that the proportion of deaths from pneumonia for the second quarter sometimes exceeds that for the first, and a higher proportion is reached for bronchitis in the winter months. For 1874-75 we find the proportional deaths from pneumonia for one year are 24 in the first quarter of the year, and 30 in the last; in the next year these proportions, exactly reversed, are 30 in the first, and 24 in the last quarter; the mean curve not reaching 30 in either the first, second, or fourth quarters of the year, nor much below 20 in the third quarter. The bronchitis curve, as low as 10 in the third quarter, suddenly rises to 35 in the last, and to 45 in the first quarter of the year. Some explanation

of the exceptions for these two years is afforded by Mr. Glaisher's remarks in the Registrar-General's Thirty-eighth Annual Report; he there says, "Taking into account the very severe cold weather from the 21st of November 1874 to the 1st of January, the winter of 1875 was one of unusual severity. The weather was again very severe at the end of the year, with a long continuance of east wind."

I would here observe that two forms of pneumonia, essentially distinct, *are* characterized by the course of body temperature in each. In the one form the clinical temperature chart shows three, four, or more days of moderate fever leading to a height of 103°; very exceptionally to 104°; and never long maintained at the higher point. This chart of catarrhal or secondary pneumonia is at once recognised by its central peak. The temperature chart of true acute primary lobar pneumonia commences with a temperature of 103° even in the first day of chill, and before the local signs of the disease are distinct; the temperature then suddenly rises to 104° or 105°, and is steadily maintained between those heights for six, seven, or eight days, with no marked evening exacerbation; it then descends by two steps to the normal, the first descent preceding any marked improvement in the lung. Other diseases may show a similarly rapid defervescence after the completion of their special local processes; few, or none, begin with as high a temperature so evenly sustained to the crisis. In erysipelas the temperature may rise as high, but it is subject to sudden depressions, and the course of the disease is often prolonged. In typhus, the maximum temperature may be higher, but this, to quote Dr. Buchanan, "is in favourable cases only attained once or twice throughout the fever, and generally of an evening;" there is again a rise in the second week before the final defervescence. The ingress of typhoid or enteric fever is marked by a gradual rise of temperature with evening exacerbations. Measles has a very characteristic temperature chart resembling that of pneumonia only in the sudden fall at its close, but differing from it more widely than that of any other of the acute specific diseases; in some part of its course it approximates somewhat to that for catarrhal pneumonia.

The temperature changes observed clinically in the course of

pneumonia serve to point out the clear differences existing between the catarrhal form of secondary pneumonia and the true acute primary or lobar pneumonia, lately distinguished by the not very appropriate term croupous, with which this paper alone proposes to deal. Pneumonia requires no qualifying prefix, unless it occur in complication of some other disease. The temperature changes are wonderfully constant for all forms of acute pneumonia, however produced and whatever the age of the patient. In a recent paper read by me at the Manchester meeting of the British Medical Association, I showed that the disease was not uncommon even in young children and infants. In some cases, where death is attributed to convulsions or spasm of the larynx, consolidation is found in the pulmonary lobes. It is less fatal in the second year of infancy; in some cases at this age, and in others from five to ten years of age, the temperature conformed exactly to the type given. Some of these cases occurred in the winter, some in the summer; two had suffered previous attacks, and five were associated with the presence of sewer-gas. I have met with four cases this summer in men from the most different causes; one, from getting wet in July, had a rigor the evening of the day of the wetting; after eight days of high temperature exactly agreeing with some of the children's cases, he speedily lost all consolidation in the affected lobe. One of the children, a girl, had only five days of high temperature, the sudden improvement being very marked, as was the onset, which was accompanied by delirium; one girl, after a subsidence of temperature on the eighth day, had a reaccession of fever ranging from 103° to 104° till the fourteenth day. One boy, from double pneumonia, had a relapse with return of high fever on the eighth and ninth days. All those cases did well. In one fatal case the temperature had begun to decline, but the pulse at the same time increased in frequency, contrary to what was observed in favourable terminations. Pneumonia, if less frequent, in the aged is very fatal. In the very young it is less fatal than catarrhal or broncho-pneumonia, to which type the greatest number of attacks in cold weather for both extremes of age is to be attributed, and hence the excessive mortality for our climate in the winter months.

In many places, with the lower return for the first quarter, the maximum for pneumonia falls in the second quarter of the year. This, if exceptional for Edinburgh, Dublin, and London, is the rule in many continental towns, as in Copenhagen, Berlin, Zurich, and Turin. In Switzerland, March gives the highest returns, and in Paris, April; the maximum being always in the spring. In many parts of Europe pneumonia is spoken of as a May epidemic. In cold seasons greater prevalence of catarrh and bronchitis in our climate induces a certain amount of broncho-pneumonia in the very old and the very young; this is added to the returns for pneumonia proper, and so unduly influences the curve for its seasonal fatality. With more precision in diagnosis, signs of which are already apparent in the London returns, the curve for pneumonia will contrast still more than now with that for bronchitis. As the adventitious excess is removed from the winter returns, the proportional lowering for the summer will be lessened and our pneumonia curve for London will approach nearer that of Berlin.

[1st qr. 29·, 2nd 33·3, 3rd 19·, 4th 18·7.]

Bronchitis is found always increasing as we advance from the tropics to higher latitudes. Pneumonia shows no such increase. It is as fatal in Turin as in Hamburg. Our troops have shown as large a percentage of illness from this cause in the Bahamas as at home. The statistics of pneumonia by Huss for sixteen years in Stockholm agree very closely with those of the south of Europe. The account of an outbreak of pneumonia in the winter of 1866-7, in the Christiana prison, quoted in the *Dublin Journal of Medical Science, loc. cit.* for 1875, resembles what is recorded last summer in the *American Journal of the Medical Sciences*, where the influence of overcrowding in producing the disease is intensified by the hot weather. With the conclusion of the authors of the Dublin paper, that the differences between bronchitis and pneumonia do not depend exclusively on meteorological conditions, all must agree, but between this summer and winter pneumonia I see no difference of type.

We have two accounts of pneumonia occurring in the American prison, one by Dr. W. B. Rodman, giving the general

history, in the January number for 1876, Vol. LXXI., new series, of the *American Journal of the Medical Sciences*; the other by Dr. Samuel E. James in the July number of that journal for 1877, with clinical details, proving the cases to be severe acute pneumonia with typical temperature chart. Dr. Rodman speaks of two previous outbreaks in the Kentucky state prison (lat. 37 N., long. 85° W.); in 1874 there were seventy-five cases; in the autumn of that year pneumonia was very prevalent in the whole district; the weather was cold, there was no excessive prevalence of zymotic disease; from January 1st to February 24th sixteen cases occurred; but he says, "was it cold or epidemic influence, this influence ceased;" and in February, 1875, cases of a very fatal kind began to enter the prison hospital. An explanation of this is afforded by the following facts: that, on February 1st, there were 694 men in a cellular prison constructed with 648 rooms, of only 170 cubic feet space each, in six tiers, the 108 top ones not being habitable in warm weather; that by March 1st, by an excess of admissions over discharge the number of inmates was raised to 755, so that more than 100 cells had to receive two occupants; the men were allowed soil-buckets at night and about 400 would be used; foul air was said to be worst at the upper part of the place, and five-sixths of the cases occurred in the top cells. Up to July 1st, 118 cases of pneumonia were admitted to the hospital, 98 of them severe, with 25 deaths. Dr. Rodman adds (p. 83) "no case arose from contact, mediate or immediate, with a person having the disease." The invasion was sudden, the more it was regarded as a symptom of systemic poisoning and treated as such the better for the patient. It seems to have been under exactly similar conditions in the next summer that Dr. James met with twenty-eight cases in this same Kentucky Penitentiary occurring from March to August; he gives the temperature changes throughout the disease for all those twenty-eight cases. The invasion was marked by a chill; a temperature of 103° was found on that day or the next, when it was often 105°; one case reached 106° on the second day, with recovery. The good effect of repeated cool baths, combined with quinine in half-dram doses at night, is obvious. A fall of temperature from 104° to 102° and 100° on the seventh and eighth days with recovery is frequent. Of eighteen cases treated

with the bath and quinine three died, or 17 per cent. ; of ten cases treated by quinine alone two died, 20 per cent. or one in five, the ordinary hospital fatality. One of Dr. James's cases suffered a second attack shortly after recovery.

Altitude has been shown by Ziemssen to have as little influence as latitude in favouring the occurrence of pneumonia. Nor can it be said to have a preventive effect. In going over the Registrar-General's thirty-eighth report no immunity is found for the hilly northern district of England over the low-lying flat counties of the south-midland division. The mortality from pneumonia in Wales is higher than for either of those districts, and is now in just double the proportion given by Juergensen; the great increase being in South Wales. Indeed the mortality is greatest where are the largest towns. Close rooms and bad air more predispose than does out-door exposure, unless that be prolonged, or the individual resistance weakened by fatigue or intemperance. It is not so much high or low temperature by itself as the sudden change from one to the other that may determine a seizure.

Sex has a certain limited and secondary relation to pneumonia of some importance in this inquiry. More males than females die of pneumonia; the gross proportion is given as six to five. In the earliest ages a difference is found because more boys than girls are born. From the ages of from two to ten or fifteen years, when the number of the sexes is more equal, the mortality also is nearly equal; but onwards, from twenty to eighty, men fall victims to this disease in much greater proportion; the number is double at the ages of from twenty-five to sixty-five for men: yet women in advanced pregnancy and after delivery are specially liable to suffer. In 1875 more deaths were registered from this than from any other cause not directly attributable to child-birth; the number from pneumonia being 216. Some diseases have always a larger proportional mortality for women than for men, for girls than for boys; these are influenza, diphtheria, and whooping-cough. In some years of excessive prevalence of pneumonia—1847 for instance, when the mortality was said to be greater for the female sex—we may infer the existence of some widely-spread epidemic influence such as that of influenza.

We are so largely indebted for facts in the etiology of pneumonia to the original publication on this subject by W. Ziemssen, as to wish that in the recent republication of some of them by Juergensen in H. Ziemssen's *Cyclopædia* more recent data of the same kind had been utilized. His diagram for the comparison of diseases which coincide in point of time, drawn from the London Mortality Returns of 1840 — 56, now serves chiefly to indicate the value of such returns for etiological purposes. Pneumonia is still represented as causing a greater mortality than bronchitis, though it is thirty years since this was true for London. Dr. Farr's Appendix to the Thirty-fifth Annual Report of the Registrar-General gives the proportional advance every five years, from 1850 to 1870, of the difference in the returns of mortality from these causes in England to each million of population as

Bronchitis,	1016·4	1358·6	1658·2	1839·2	2100.
Pneumonia,	1239·	1294·2	1199·2	1073·2	886.

The decrease in the proportional number of deaths returned as from pneumonia is more than equalled by the increase under bronchitis; under the latter head is probably included many deaths from chronic illness previously returned as phthisis. Advance in diagnosis may also transfer some chest diseases from the heading of phthisis to that of heart-disease. In the United States and some other countries the deaths registered as from pneumonia still exceed those from bronchitis.

The data on which my further observations are in the main founded are derived from the Registrar-General's annual reports for the thirteen years 1863—1875 inclusive, and from the digest of the metropolitan bills of mortality for the thirty years 1845—1874, prepared by Mr. Buchan and Dr. Arthur Mitchell.[1] This digest extends over a sufficient time, it includes a population sufficiently numerous, in a limited area, under the same conditions of climate and temperature, to admit of statistical treatment. The authors have prepared it to determine the seasonal variations of the diseases registered. Relations not seen in the annual records of disease may become evident by a comparison

[1] *Journal of the Scottish Meteorological Society*, July, 1875.

of their seasonal variations. Curves of mortality for each week and month of the year are given, in the remarkable paper referred to, as the true constants for the seasonal mortality from many diseases. That for pneumonia is steadily marked through the different months from year to year. It is never very high in January nor in the coldest weather; it is highest at the end of March. A very similar curve is found for laryngitis, quinsy, whooping-cough, and croup. The most surprising result brought out by this study is, that while deaths from all other diseases of the respiratory organs vary to some extent with season, those from phthisis are nearly constant throughout every week and month of each year.

Since 1873 the deaths registered as from phthisis are less than from bronchitis; the proportion to one million population being in 1875: phthisis, 2,200; bronchitis, 2,600; pneumonia, 1,141. It may also be noticed, in face of this difference of registration, or, as I am disposed to call it, this increasing accuracy of estimate, that pneumonia has again become as high as ever. This increase is not always concomitant with that of bronchitis. Pneumonia is at its highest in 1869—70, when there is no increase in bronchitis; it is low in 1872—3, when bronchitis at the end of that period was high, and the cold and fog is remembered by its effects at the Cattle Show. A warm season is always indicated in the table by a simultaneous rise in the death-rate for diarrhœa, and a fall in that for bronchitis. This is seen for the years 1865—68, and 70—71. In 1872 there is a fall in both, and pneumonia is at its lowest. At this time all epidemic disease except whooping-cough was subsiding. With the subsequent increase of pneumonia a steady increase is noticed in scarlet fever, diphtheria, and erysipelas. Measles, high in 1874, was low in 1875, so that any accidental increment of pneumonia from the effects of either whooping-cough or measles is not such as to have any marked influence on the pneumonia returns. We can hardly suppose that diagnosis is yet so generally advanced as to exclude the pneumonia consequent on either of those diseases from registration as pneumonia on the ground of being catarrhal or secondary, and consequently not a true pneumonia. The previous returns show no such general correspondence between either of these three diseases or scarlet fever

as to support the idea that any common set of influences favours their increase. There seem grounds for inferring some such common influence in the case of erysipelas, puerperal fever—to which I shall again have occasion to refer—and diphtheria; the pneumonic complications of the latter, besides being always of the secondary or catarrhal type, are too inconsiderable to have any effect on the death-rate of pneumonia.

For an instance of the corresponding variations noticed, by W. Ziemssen, between pneumonia and the continued fevers we must go back to the years 1865-66; though those fevers were not separated in our registration of deaths until the year 1869 the fluctuation noticed before that time in the returns were probably owing to typhus, and there can be little doubt that it was with typhus and not with typhoid or enteric fever that Ziemssen associated pneumonia. Juergensen, speaking of pneumonia and typhoid as instances of "fixed epidemics," contrasts them by calling pneumonia the epidemic of May just as typhoid is the epidemic of autumn. With us, as well as in Germany, these two diseases occur most at different parts of the year. Moreover, sanitary work in England is gradually limiting the range of enteric fever till the proportional mortality from that cause is not half what it was ten years ago; that from pneumonia remains the same. The association of pneumonia with enteric fever is shown by Dr. Grimshaw and Dr. Moore to have occurred in Dublin during the year 1874. The monthly deaths from both pneumonia and enteric fever averaged 3 per cent. above those of the preceding five years; but the respective seasonal mortality from these diseases did not coincide, nor did their seasonal prevalence. For enteric fever the returns show the greatest irregularity; for pneumonia the mortality is greatest at the colder extremes of the seasons when it is most prevalent. One of these was in the great drought of the summer of this year (1874), when the bed of the Liffey became an intolerable nuisance. During this time the admissions to the Cork Street Fever Hospital for acute primary pneumonia, numbering altogether forty cases, reached to three times the ordinary rate.

The correspondence for typhus and for pneumonia in the earlier years tabulated by Ziemssen exists. We know that such causes as overcrowding and bad air favour both diseases; but while a

specific cause is required in the one that we can eliminate, there is either no such specific cause for the other, or one we know not how to escape. It would even seem as if confinement in deficient air space would suffice of itself to determine pneumonia, while, to generate typhus, the presence of its special poison was necessary. The remarkable decrease both for pneumonia and typhus in London during the years taken by Ziemssen may be owing to the enforcement of the Common Lodging House Act at that time. Not only were cases of fever removed and the places disinfected, but the provisions against overcrowding very strictly enforced. Typhus and small-pox, once the "black deaths" of this country as well as of Europe, are so reduced here by sanitary legislation, that instead of occupying a higher line of mortality than my diagram is constructed for, they are now barely discernible at its lowest part. The subsidence of these two epidemics is however marked by no general depression of the pneumonia returns; no essential connection is shown.

The epidemic of small-pox in 1871 has not perceptibly raised the annual pneumonia rate; yet a certain amount of pneumonia occurs in the course of small-pox and often terminates it, as it does in both typhus and typhoid fever, measles and whooping cough. All secondary pneumonias should be deemed as part of the diseases they complicate. The pleuro-pneumonia of cattle is most likely the pulmonary complication of a specific general disease, having a fortnight's incubation, and consequently distinct from pneumonia as here considered, the ingress of which is sudden.

Studying the seasonal variations of disease as shown by Buchan and Mitchell, some of these relations become more apparent. We may distinguish three varieties of curves: (1) some that depend chiefly on temperature, as those for bronchitis and diarrhœa; (2) some that depend on individual constitution, as those of phthisis and gout, the one apparently uninfluenced by season, the other showing some influence of that kind; (3) different curves for the various acute specific diseases; these are very characteristic for each disease, depending evidently on some law special to the disease, and only varying in a secondary manner in accordance with season and temperature. Phthisis, so to speak, represents the equator, bronchitis

and diarrhœa the north and south poles respectively, of the sphere in which the acute specific diseases have sway.

Of this third class of curves small-pox is the most marked type; varying as the deaths from this cause have of late from more than 23,000 in 1871 to 950 in 1875, the curve on the diagram continues nearly the same from year to year; the epidemic of 1871 only accentuates the curves without changing them; and if the epidemic years were left out of the calculated average the difference represented by the dotted line, reducing both the maximum and minimum of the curve but not displacing them, is all the change that would result. The constancy with which small-pox always declines in June may offer some explanation of the problem brought before our society by M. Léon Colin, why small-pox, so severe in Paris during and after the siege, did not spread among the inhabitants who afterwards returned.

The regularity with which scarlet fever reaches its maximum, recently brought to our notice by Dr. Evans, is confirmed by every year's returns utilized in the diagram. A similar curve for enteric fever, not quite so suddenly rising to the height, marks this disease as an autumn epidemic, offering just the same contrast to small-pox here as our President has shown it does in India. The curve for whooping-cough is exactly the reverse of that for scarlet fever, and though cold weather in spring may increase the fatality of this as it does of infantile laryngitis, it is not much concerned in producing the disease, as proved by both tables. Measles has a totally distinct curve from that of whooping-cough, showing both a summer and winter increase. This is what Dr. Buchanan led us to expect from his paper on the "Concurrence of Epidemics," that those two diseases run quite independent courses.

The curves for erysipelas and puerperal fever are nearly identical. The paper which I copy says, "Puerperal Fever has a well-marked curve having its maximum period from November to March, and its minimum period from the middle of June to the fourth week of September. It resembles the curve for erysipelas, the agreement in many respects being singularly close." To this curve that for pneumonia approximates most. Diphtheria comes near to it, but shows some considerable differences. It is

doubtful whether croup approximates more to the pneumonia or the diphtheria curve. Under croup, evidently deaths from at least two different diseases are included; the autumn rise in this curve may be attributed to cases of diphtheria. Quinsy, excepting the summer rise, comes very near to pneumonia. In the annual fluctuation of disease no correspondence is seen in the advance and decline of diphtheria and pneumonia. With the late increase of pneumonia, erysipelas also shows an increase in fatality, both occurring in local epidemics. Besides the seasonal variation of puerperal fever agreeing with that for erysipelas, the returns show that they have also advanced together for the last two or three years.

The curve for whooping cough differs as much from that for bronchitis as does that of pneumonia, which in some part of its course it closely follows. Laryngitis agrees closely with whooping cough, its greatest fatality being in the spring; and it is not unlikely that some of the deaths returned as laryngitis are owing to the specific poison of whooping cough. The curve of seasonal fatality for pleurisy has as much the character of a constitutional affection as of a simple inflammatory one, if such a thing exist. It is known that pneumonia is frequently accompanied by pleurisy: but pleurisy still more often occurs without pneumonia; in all probability the deaths returned as pleurisy in the curve are uncomplicated, except it may be with rheumatism, for it closely follows the curve for heart-disease.

As to the question of a specific poison for pneumonia, definite as is the lesion resulting and marked as is its course, there seems to me neither necessity nor reason for such an assumption. The argument in favour of a specific poison drawn from the difficulty of inducing the disease by direct irritation of the lung is met by the fact, demonstrated by Friedländer, that the disease is readily induced after section of the vagus, or recurrent nerve. Many conditions, the poison of any of the specific diseases, as well as of bad air, fatigue, exposure, chill, and some constitutional predisposition, may also lower nerve-tone, and predispose to an attack. The definite duration of pneumonia, the cessation of the general febrile disturbance before the subsidence of the local mischief and the tendency of that to disappear after the febrile stage is over, are all found in diseases not necessarily brought

about by an infecting germ. In its tendency to affect some persons more than others and to recur, it resembles erysipelas; there are also unexplained outbreaks of pneumonia, local and periodical, associated both with circumstances of defective hygiene and with those that tend to expose the body to infective processes, that cannot be disregarded. All these considerations by removing pneumonia further from the character of a local inflammation, and correlating it with the general diseases, tend to a clearer knowledge of the relations of the disease, and bring it under the dominion of conservative medicine.

THE ETIOLOGY OF SCURVY:—OFFICIAL REPORT OF THE NAVY MEDICAL DEPARTMENT ON THE OUTBREAK AMONG THE CREWS OF THE ARCTIC EXPEDITION.

[We have refrained from taking any part in the discussions that have been rife on the causes of the fatal outbreak of scurvy which occurred among the sledging parties of the late Arctic Expedition, and on the results of the official inquiry relating thereto made by the Admiralty. We now reprint, without comment, from the *Statistical Report on the Health of the Navy for the Year* 1876, which has just been published, the account of the outbreak there given. This gives a peculiarly clear and precise description of the circumstances attending the outbreak and of the conditions which determined it, and forms a most valuable and instructive contribution to the etiology of the disease.—Ed. Pract.]

"The outbreak of Scurvy in the Arctic expedition has formed the subject of minute and exhaustive inquiry by a committee appointed for the purpose. Their Report, which has been presented to both Houses of Parliament, and made public, embraces all aspects of the question, and renders any lengthened detail here unnecessary.

"The ships were manned by picked crews, and were fitted out and provisioned in the most liberal manner, under the superintendence of a committee of experienced Arctic officers. The preservation of the health of the men was always looked

upon as of the highest importance ; and the number of days' sickness previous to winter quarters being reached was insignificant.

"The *Alert* passed the winter at Floe-berg Beach, Grinnell Land, in lat. 82·27 N., and long. 61·22 W., while the *Discovery* went into winter quarters in a bay named after the ship, in lat. 81·44 N., and long. 65·3 W. The absence of the sun in the former place extended to 142 days, and in the latter to 138 days. These are longer periods of darkness than any to which former Arctic expeditions were exposed, and the intense cold experienced in these high northern latitudes was also somewhat greater and more prolonged than any previously reported. The lowest reading of the thermometer was on the 3rd March, at Floe-berg Beach, when Fahrenheit's thermometer stood at 73 minus.

"The winter arrangements for securing the health and cheerfulness of the ships' companies were based on the experience of former expeditions, and seem to have been made and carried out with the greatest care. The dietary was liberal and varied, and received much attention. Lime-juice had been issued from the time of the ships leaving England in the proportion of one ounce per diem for each person, and was consumed by the men every morning under the inspection of an officer. The ventilation of the inhabited parts of both ships was managed as well as the low external temperature would permit, though from the necessary confinement of the men for long periods to the living deck, the atmosphere became charged with moisture, and carbonic acid gas accumulated, as has always been the case in Arctic ships. The officers and men took exercise in the open air daily when the weather permitted, and amusements of various kinds were established.

"Periodic inspections were made into the health of officers and men in both ships, and the medical officer[1] of the *Alert* reports that, 'on March 3rd, the day after the sun was again seen, there was not a person on the sick-list, and at the end of March but one case of frostbite was on the list.' During the first quarter of 1876, 'the crew of the *Alert* were twenty-five days on salt provisions, three on fresh meat, and sixty-three on preserved meat. Lime-juice was issued daily, and soft bread on eighty-two days.'

"The report of the medical officer[2] of the *Discovery* on the 31st of March is, that 'frequent examination of the crew shows them to be in excellent health, due, I have no doubt, to the frequent issue of fresh meat. Salt provisions were issued on thirty-two days, preserved provisions on twenty-nine days, and musk ox-beef on thirty days.'

"Notwithstanding the favourable report from the medical officer of the *Discovery*, the first case of scurvy noticed in the expedition was placed on the sick-list of that ship as early as the 1st January, but it seems to have been an entirely exceptional case, dependent on the misconduct of the subject of this attack. He was an artificer, æt. 34, who is stated by the medical officer to 'have been accustomed to drinking to access, to have disliked the preserved meats and vegetables, to have been very fastidious about the flavour of musk-ox meat, and to have surreptitiously abstained from all these whenever he found an opportunity.' He had first complained of pains in the left knee and groin, and his gums were spongy and inflamed, and it is stated that in spite of an antiscorbutic regimen, scurvy rapidly developed itself. At the end of three months' treatment, the report is :—'His present condition is one of great depression ; inability to eat

[1] Fleet Surgeon T. Colan, M.D.
[2] Staff Surgeon B. Ninnis, M.D.

any but the softest food; he is crippled by contraction of the hamstring muscles; and has occasional epistaxis, and dyspnœa. There are no abnormal stethoscopic signs. Everything has been done to arrest the progress of the disease, and the patient is now certainly gaining strength, but the extreme cold and absence of sunlight have been very much against him.' This man was not fit for duty on deck until the 26th June, and it may be assumed from the medical officer's description of his character, that he was unlikely to pay great attention to the directions given for the treatment of his malady.

"A somewhat similar case, though appearing later in the year, is reported from the *Alert*, and may be mentioned here, as these two cases, and one of frostbite where scurvy supervened, form the only exception to the rule that scurvy in the expedition was confined to the officers and men employed in travelling parties. This case was that of the ship's steward of the *Alert*, who was placed on the sick-list on the 8th of April, for contusions of the lower part of the thighs from the pressure of a heavy cask of provisions. He is stated by the medical officer to have been a man who occasionally indulged in alcoholic excesses, and on the 1st of May, after twenty-two days' confinement to the ship, he exhibited well-marked symptoms of scurvy.

"The number of officers and men of the two ships on the 1st of April was 122; seventy of these being borne in the *Alert* and fifty-two in the *Discovery*.

"Sledging operations commenced from both ships early in April, and employed the greater number of the men, who, before engaging in them, were carefully examined as to their fitness by the medical officers. These operations involved a total change of diet, labour of a most exhausting description, and the exchange of the warmth and shelter of the ships for intense cold and the poor protection of a tent at night. Before many days had passed scurvy began to appear. The earliest case occurred in a man belonging to the *Alert*, who was in the northern exploring party under Captain Markham, and who showed symptoms of scurvy on the eleventh day after leaving the ship. Another man in this party became ill on the twelfth day, and another on the sixteenth, and these cases were rapidly followed by others. In the North Greenland division of the exploring parties, the earliest appearance of scurvy is reported to have been on the eighteenth day after their departure from the ship.

"In the chief and extended sledge parties from both ships no man escaped scurvy, and, with one exception, the officers also showed indications of it, though only one of them required to be placed on the sick-list on reaching his ship.

"According to the reports of the medical officers, there were fifty-six cases of scurvy among the officers and men employed in the sledging parties, and of these fifty-six cases, thirty-eight were among men of the *Alert*, and eighteen in the crew of the *Discovery*. The thirty-eight cases in the *Alert* represent the attacks of the same number of separate individuals, whereas, as three of the eighteen cases in the Returns of the *Discovery* were relapses, only one officer and fourteen men of the travelling parties from that ship suffered from scurvy.

"The deaths from this disease were confined to the travelling parties, and occurred when the men were absent from their ships. The first death was that of a seaman of the *Discovery* who had passed the winter in the *Alert*, and who joined the North Greenland party under Lieut. Beaumont on the 20th April. His first complaint was of stiffness of legs, and he made it on the 7th of May, but in a few days he became unable to pull at the drag-ropes, and on the 13th May ecchymosed spots were observed on his legs, and he was unable to eat biscuit, unless soaked, on account of the soreness of his gums. He also suffered from cough, dyspnœa, and vertigo. On the 15th May he had rigors, and on the

following day, with an aggravation of all his symptoms, there was a craving for lime-juice. Up to the 21st May he was carried frequently on the sledge, but from this date he was utterly unable to walk at all, and was always on the sledge. His teeth began to fall out on the 25th May, and he became peevish and irritable. On the 31st May rigors are again noted, and dyspnœa was more urgent. On the 3rd June the sledge party to which this man belonged arrived at Polaris Bay Depôt. He had been delirious for the last few days, and there were signs of impending dissolution. This depôt contained supplies of lime-juice, preserved meats, and vegetables, but they came too late to succour the unfortunate man, who died at 10.45 p.m. on the day of his arrival.

"The second death from scurvy, in order of time, was that of a gunner of the Royal Marine Artillery belonging to the *Alert*, who left in the northern expedition on the 3rd April. The work of the party was extremely heavy and laborious, and this man broke down on the 17th April with swollen knees, and was carried on the sledge, the temperature of the air at the time ranging between – 21° and – 26°, and in the tent between – 5° and – 15°. On the 22nd April, in endeavouring to walk after the sledge, he fainted, but was revived by a dose of aromatic spirits of ammonia. It is also stated that at this time he occasionally expectorated blood, and complained of weakness, faintness, and pain in the stomach. On the 1st of May a rash on the legs, with discoloured patches about the knee, soreness of the gums and looseness of the teeth, are noted, and from this time he became steadily worse. Dyspnœa and pain in chest were relieved by sinapisms, and he was occasionally given some aromatic spirit of ammonia. A little lime-juice that had been taken by the commander was, as long as it lasted, also served out to him in his grog. There was a slight rally about the middle of May, and he continued in much the same condition throughout the remainder of that month, and until the 5th June, when he is stated to have become weaker, and quite helpless. Pain in left side now came on, and he suffered from violent cough and retching. Dyspnœa is also mentioned as one of his symptoms. On the morning of the 8th June spasmodic or convulsive symptoms set in, and he became unconscious, but revived under the influence of stimulants. There was a similar attack later in the day, after which he gradually sank, and died a few minutes after midnight.

"The third man who died was a seaman of the *Discovery*, who left the ship on the 6th April, but exhibited no signs of scurvy until the 17th May. By the 28th May ecchymosed patches appeared, and he was unable to drag, and from the 3rd June he was carried on the sledge. On the 25th June, when the party was on its return to the Polaris Bay Depôt, it was met by a relief sledge and a medical officer, who found this man perfectly prostrate in the last stage of scurvy, and in spite of the administration of suitable remedies, and of an antiscorbutic regimen, dyspnœa became more and more urgent, and death took place on the 29th June.

"Many of the cases of scurvy, on the return of the travellers to their ships, were of a serious nature; effusion in the pleuræ existing in several of them, and there was a tendency to syncope and diarrhœa among them. The free use of lime-juice, and a dietary composed of musk-ox meat, ducks, hare, geese, ptarmigan, and mutton, with preserved potatoes, cabbage, pickles, and fruits, as well as many medical comforts, and small quantities of mustard and cress, and some stunted sorrel from the shore, soon produced a great change in the sick men. As they got better they were sent on deck, and from that time made rapid recoveries. The symptoms that appear to have lasted longest were rigidity of the hamstrings and induration of the muscles of the legs. One or two men remained on the sick-list until the beginning of September, but the majority were free from all symptoms of scurvy and had resumed their duties during July and August.

"In considering the origin of this serious outbreak, it is not possible to escape from the conclusion that its primary cause was the omission from the dietary of the sledging parties of a sufficient supply of the antiscorbutic elements of food. No lime-juice was included in the dietary, and the quantity of preserved potato and other vegetables carried was very small.

"While living in the ships a varied and liberal allowance of vegetable food was given, for by the dietary it appears that eight ounces of preserved vegetables, of which potatoes formed a part, were issued to each man on one or two days of the week, four ounces on four days, and an ounce of compressed vegetables on one or two days. Vegetables were also frequently contained in the preserved meats that formed a large portion of the rations. Pippins or preserved fruits were served out twice a week, and, as previously noticed, a daily ration of one ounce of lime-juice was given to each person, and in the *Alert* was supplemented by a second issue of the same quantity during the month before the departure of the travelling parties.

"The sudden transition from this dietary to one so widely different, and so deficient in vegetables or their substitute, lime-juice, together with the excessive amount of labour in dragging very heavy weights over irregular hummocky ice and through deep snow, with scarcely any previous training, and all the hardships and privations incidental to sledge travelling at a low temperature, are sufficient to account for the early appearance of scurvy in the sledge parties. It is also possible, notwithstanding the testimony of the medical officers to the healthy condition of the men when they started, that some deterioration of health had arisen during the long winter that predisposed to disease, and therefore favoured the early development of scurvy. It must not be forgotten that the winter had been necessarily passed in confinement to the lower deck for the greater part of every twenty-four hours, and that some unavoidable causes were in operation, such as the absence of sunlight, an impure atmosphere, and dampness, that tend to lower the tone of health, though its deterioration may not have been perceptible to the medical officer, or apparent to the men themselves, who started in high spirits and displayed great courage and cheerfulness in meeting the very great hardships, difficulties, and suffering that befell them.

"The *Alert's* crew suffered in much larger numbers than the *Discovery's*, and it has been suggested, in explanation of this fact, that in the latter ship fresh meat, in the shape of musk-ox beef, was much more frequently issued to the men during the winter; but, from the account of the spring travelling, it is found that three out of the four crews engaged in the extended sledge journeys consisted of men belonging to the *Alert*, and it follows that they were exposed in much greater numbers to the causes of scurvy, operating for a long period of time, and therefore a larger number of cases was to be expected among them.

"The antiscorbutics with which the ships had been supplied were amply sufficient to effect a rapid cure of the disease after the men's return, and on the 8th September, when the vessels left the ice, there was not a single person on the sick-list of either ship."

THE PRACTITIONER.

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Original Communications.

AN ADDITION (?) TO THE THERAPEUTICS OF TETANUS.

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An interesting and suggestive article appeared in the *Practitioner* for August "On the State of Therapeutics in Tetanus." The author, after sketching the success and failure of the different methods of treatment, "makes an appeal to pathology to throw fresh light on the nature of the disease; for experiment long on the track of discovery seems now at fault," &c.

There is no doubt that our knowledge of the pathology of tetanus is in a very unsatisfactory condition, and that our treatment has until recently consisted of feeble gropings in the dark, but I cannot but think that we do at last see some glimmer of light.

Here, in this island, we have been very successful in the treatment of tetanus. Of six consecutive cases treated by myself and my father, Surgeon to the Government Hospital, no less than five have recovered. Three were of the traumatic kind, one of which died.

Mr. Semper, of this island, Surgeon to the Sandy Point Hospital, informs me that he has also saved five out of the last six cases attended by him, one case of idiopathic tetanus dying. So we have ten recoveries in twelve consecutive cases. If such a proportion can be kept up, surely it must be conceded that, considering our "present knowledge of the conditions to be met," we are fairly successful. And yet there was absolutely nothing new in the treatment of the above cases.

Dr. Semper treated his with chloral and opium combined. I may here add that he commenced administering these drugs together in tetanus nearly ten years ago.

To all my cases I gave chloral and Indian hemp; and it is to this method that I would call attention, as I firmly believe that, if thoroughly carried out, not less than 75 per cent. of recoveries would be the rule.

The author of the above-mentioned article says of chloral, "large doses must be given and may be given without fear." This is the secret. To an adult I give as the first dose 30 grains and 2 grains of Indian hemp. Three hours after I increase the dose to 45 grains, and then to sixty grains after a like interval. I find this quantity, with 4 grains of Indian hemp, every three hours, generally sufficient for an average case of acute tetanus. I have given as much as 720 grains in the 24 hours, and one patient consumed one pound of the drug in fourteen days with excellent results. The object in pushing the drug to this extent is to keep the patient fully narcotised until the mischief in the nervous system has righted itself. What we fear is the tetanic spasm frequently recurring, wearing away the patient's strength, and each time endangering his life by the risk of death from apnœa caused by spasm of the respiratory muscles.

The patient, when fully under the influence of the drugs, lies with all the muscles relaxed. Sometimes there are a few slight spasms, as often there are none. He can be easily roused to take nourishment, which should be given in a fluid form and warm. Now it seems to me that the mistake practitioners make when exhibiting chloral in tetanus is that they wait till the effect of one dose has worn off before they give the next. It is impossible to treat the disease with any great success in this

manner. Keep the patient thoroughly and continuously under the influence of the drug, and if you can tide over the first fortnight you may count on pulling him through. But great caution must be exercised just at this period. In one of my cases, on the sixtieth day of the disease, as there had been no spasms for three days I ordered the medicine to be discontinued; twelve hous after, in my presence, he had a severe spasm; the treatment was at once resumed, and there was no return of the disease until the twenty-first day, when precisely the same thing again occurred. This patient ultimately recovered.

The reason I give Indian hemp is that it seems to give a sort of continuity to the effects of chloral. When the latter is given by itself the patient seems to come from under its influence suddenly, and may have severe tetanic spasms all at once. Whereas with the combined drugs there is, as it were, a gradual awakening with slight spasms increasing in intensity. I do not, therefore, think it is possible to treat acute tetanus with chloral alone.

SOLID FOOD IN TYPHOID FEVER.

BY SAMUEL PETERS, M.D., COHOES, N. Y.

I READ at the time of publication the remarks of Dr. Turney on the above subject, and fully endorsed them. Subsequently, the hasty and somewhat severe article of Dr. Dyce Duckworth appeared in the *Practitioner* of December, 1877, as a criticism upon Dr. Turney's paper. The question being therefore before the medical public, I desire to say simply that my experience (and experience is far better than any theory or hackneyed notion, however old) coincides exactly with that of Dr. Turney. Over and over again I have found that the ingestion of tender meats, or bread and milk, has exercised a beneficial influence on the disease, moderating the diarrhœa, moistening the tongue, restoring consciousness, diminishing the heat, &c., &c.

It is very plain that Dr. Turney has faithfully tried both plans, and that Dr. Duckworth has not: which has the advantage?

Indeed the doctrine is not new. Families as well as physicians are not unfrequently met who very independently and successfully urge in this particular disease, and many others, the daily use of solid food, particularly tender boiled meats. This pertinent fact must have been noted by many observing physicians, and I for one desire to record my testimony in favour of solid food of such a character as has been named, carefully given.

An experience of nearly thirty-five years in trying to watch the course and treatment of typhoid fever may perhaps allow me to say what I have.

Drugs are often necessary, food *always*. Drugs may often be dispensed with, food *never*. The point upon which the whole question turns, is, What shall be the food? One thing is acknowledged by a sufficient number of authorities, viz., that the stomach is enfeebled, not incapacitated, that it can digest food of nearly all classes, if the quantity and time of administering be well regulated.

Liebermeister, in Ziemssen's *Cyclopedia*, argues against the use of proteid compounds in *large quantities*, but does not condemn them.

Roberts advises milk, beef juice, custard, and tea and coffee; unfortunately, in my opinion however, he adds, "fruits are not to be permitted."

Here I am tempted to relate a case that occurred at the time of our late Rebellion; a case that very well illustrates the course which I pursue in the disease under consideration.

A captain was wounded in the elbow and suffered amputation of the arm. He was removed to a general hospital, and soon typhoid fever set in.

A few days after hospital gangrene attacked the stump. He became greatly prostrated, so much so that a telegram was sent me that Captain Smith could hardly survive; I reached him by rail and steamboat in about thirty hours, and found the statements of the telegram corroborated.

He was taking large doses of quinine, tincture of iron and brandy, combined. Abdomen extremity tympanitic, evacuations uncontrollable, emaciation far advanced. He had been previously removed to a tent in the open field.

I ordered the remedies to be stopped, except a little weak sling or milk-punch. His body to be bathed frequently under the bed-clothes; several times a day he was to be *urged* to take bread and milk pretty freely, and three times a day, or oftener, some soft fried egg. A dressing for the stump of permanganate of potash. Every day, from the very first hour, I was particular to send several miles to a seaport for peaches and grapes. These were diligently but carefully given to the patient as regularly as his food. Why need I say that a favourable change was apparent in a few hours, and that he recovered perfectly? It

was remarkable how soon the tympanitis and diarrhœa improved.

This case is a type of hundreds that could be cited, and I cannot help thinking that he who sweepingly condemns fruit and solid food is inexperienced.

But the field enlarges, and I will for the present close my remarks with the gratuitous advice that Dr. Duckworth make careful trial of solid food in this disease and others of a corresponding nature, and then report to the profession.

We remember many whose opinions, at first severely condemned as *innovations*, were afterward endorsed.

ON THE USE AND ADMINISTRATION OF FAT.[1]

BY T. LAUDER BRUNTON, M.D., F.R.S.

Some time ago, an attempt to swim across the Channel was made by Johnson, then the champion swimmer of England. At first he made good progress, but at length his strength seemed to fail, and when he was at last lifted into the boat by those who accompanied him, his limbs hung down utterly powerless. It appeared that this was not so much due to real muscular exhaustion, as to the effect of cold. We know that when a muscle has cooled down very much, the nerves which supply it refuse any longer to convey impulses to it from the nervous centres, so that however powerful the effort of the will may be, the muscles will no more respond to it than they would in an animal poisoned by curara. Prolonged exposure to the cold water of the Channel appeared to have induced this state in Johnson's muscles. Afterwards, when Captain Webb proposed to attempt the feat, I felt quite certain in my own mind that he would fail, not because I doubted his powers of endurance, but because I thought that his muscles must needs be affected by the cold in the same way as were those of Johnson. But, as the event showed, I was quite mistaken, for Captain Webb succeeded in his attempt. In coming to my conclusion, I had left out of account the influence which a thick coat of subcutaneous fat might have in protecting a human being from the action of external cold, just as it does the porpoise or whale, this coating being no doubt aided by the porpoise oil with which the skin of the swimmer was lubricated, and which still further prevented the loss of heat. One use of fat, in the economy, is

[1] Read before the Medical Society of London, Dec. 10, 1877.

to act as a protective against external cold. This protective power appears also to be useful to the individual by diminishing his chances of catching cold on exposure to draughts, and where the coating of fat under the skin is deficient or absent, we must supply its place by non-conducting articles of clothing. We rarely think of covering the chest of a fat person with chamois leather or thick flannel, but these coverings are both pleasant and useful for thin or emaciated persons. In cold climates, a coating of subcutaneous fat all over the body is a useful protection, but in warm weather, or in hot climates it becomes exceedingly oppressive, as one may see by watching very stout persons or fat animals during the heat of summer. In some animals which are natives of tropical climates, or of regions in which the summer heat is great, although the cold during winter may be extreme, we find that fat, instead of being distributed over the body with more or less uniformity, is collected in huge masses at certain parts. In the zebu, or Brahmin bull of India, in the yak of Tartary, in the buffalo of the American prairies, and in the camel of the African or Asiatic deserts, we find large humps upon the back, which consist almost entirely of solid fat. On looking at a camel, we see that the hump is usually firm and solid, projecting stiffly from the back, but at times it may appear limp and loose, swaying helplessly from side to side, and doubling up like a half empty bag. On inquiring as to the reason of this, we are told that so long as a camel is well fed, the hump remains firm and solid, but that when the animal's food is insufficient it becomes thin, loose, and flabby, a great part of the fat being absorbed from it, while if the camel be kept absolutely without food for days, the protuberance will almost entirely disappear. When, on the other hand, food is again given, the hump regains its former dimensions, so that its use is apparently that of a reservoir of food, which may be drawn upon when the daily aliment is insufficient. We all know that the same thing takes place with regard to subcutaneous fat, as with the fat of the camel's hump, and that whenever the fat assimilated is insufficient for the wants of the economy, the person or animal becomes leaner and leaner, until the fat has almost entirely disappeared. To the question, Where has this fat gone? it is difficult to return a very definite answer. Probably some of it

has undergone combustion, without being formed into any other tissue, but another part of it has probably gone to supply the waste of some more important organs, which thus are enabled to live, parasite-like, at the expense of the fat. The blood contains only about one-half per cent. of fat, the muscles more than 3 per cent., the brain 8 per cent., and the nerves 22 per cent. Yet in spite of the large proportion of fat contained in the nerves, they are amongst the last organs to suffer under the process of starvation, and probably their waste is supplied by the fatty matters absorbed from subcutaneous cellular tissue, and brought to them by the blood. The different tissues probably require very different amounts of fat, and the high percentage of fatty matters contained in nervous substance indicates the necessity of fat for the proper performance of the functions of the nerves. Fat may be supplied to the body by various kinds of food—fatty, starchy, saccharine, and albuminous. For although these do not all contain fat, they are all capable of being converted into fat, to a greater or less extent, by the organism. It is not certain that the various fats formed from these different kinds of food have precisely the same composition. It is well known to feeders of cattle that fats differ in quality according to the food upon which the animal has been fattened, and that while, for example, the fat which horses lay on when fed upon corn is tolerably permanent, that produced by feeding on grass is soft, and quickly disappears when the animal is set to work. In his book on *Fat and Blood, and How to Make Them*, Dr. Weir Mitchell quotes the remark of an old nurse that "some fats is fast, and some is fickle, but cod-oil fat is easily squandered." One would suppose at first, that the fat taken in the food would be stored away in the adipose tissue without undergoing any change, but this does not seem to be the case. It appears rather that the fats are split up and modified in such a way during digestion and absorption, that, when deposited in the tissues, their composition becomes tolerably definite in each class of animal. Thus, the composition of the fat of a man will differ from the composition of the fat of a dog, although both may have been fed upon the same mutton suet, the composition of which differed from that of the fat of either. Subbotin found that when a dog was kept without food until all the fat had

gone from the body, and was then fed with palm-oil containing palmitine and olein, but no stearin, it nevertheless laid on fat which contained stearin, although in somewhat less than half the normal quantity. When palmitine and stearin were given to a starving dog, but no olein, the fat it laid on contained even more than the normal quantity of olein though less stearin.

It would almost seem, then, that fat rapidly laid on, as in the case of these animals, contained a greater proportion of olein than normal, whether this were present in the food or not. That fat may be formed from other kinds of food, such as starchy or saccharine, has been shown by Lawes and Gilbert, who found that in fattening pigs, four or five times as much fat was produced among the animals as was contained in their food, and by Liebig and others, who found that bees could form wax, which is a kind of fat, although they were fed on nothing but sugar. This is supported also by the fact that negroes grow fat during the time when sugar-canes are ripe, and when they are constantly sucking the saccharine juice. That fat may be formed from albuminous substances has been clearly shown by Voit and Bauer, in their researches on fatty degeneration, of which we will speak more particularly hereafter. Before the different kinds of food can become available for the wants of the tissues, they must be brought into such a condition as to pass through the walls of the intestine into the blood, and be carried about through the circulation. The starch is converted into soluble sugar by the ferments of the salivary glands and pancreas in the mouth and small intestine, although while it remains in the stomach this change is diminished or arrested by the acidity of the gastric juice. How the sugar yielded by the starch is converted into fat we do not precisely know, although it seems probable that the change of part of it at least into lactic or butyric acids may be one part of the process. The albuminous matters are converted into peptones by the stomach and pancreas. Some of these peptones are further split up during pancreatic digestion, so as to yield leucine, which belongs to the group of fatty bodies. The fats themselves are partially emulsionized, as well as partially saponified, by the pancreas. They then pass either through or between the epithelial cells, which cover the villi, into the lymph spaces in their interior, and thence

through the lacteals, mesenteric glands, and thoracic duct into the general blood-current. The amount of fat in the blood may be very considerably increased by food. In a dog, which had fasted for four days, a diet of bread raised the proportion of fat in the blood from 2·6 in the thousand to 3·1 ; meat raised it to 3·8 ; and suet and starch to 4·1, a most important observation, to which we shall again have occasion to refer. All these foods, as we thus see, raise the proportion of fat ; but besides the fat they all supply other substances to the blood which may be beneficial, but which, in excess, may prove more or less injurious. Thus bread supplies sugar as well as fat. If this sugar undergo the proper changes in the body, it is useful, but if it be in such excess that its combustion is insufficient, it will produce thirst and the other symptoms which we meet with in glycosuria. If the appetite or digestion will not allow of the consumption of sufficient bread to produce this, we may have a deficiency of fat. Meat also, as we have seen, produces fat, but supplies also a large quantity of nitrogenous material which may, like the sugar, prove injurious when in excess. We usually suppose that a diet of meat is the best cure for failing strength, and for weakly persons we are accustomed to recommend beef-tea whenever they feel faint. But Ranke observed that an exclusively meat diet, instead of producing strength, caused weakness and muscular fatigue, the excess of waste nitrogenous products proceeding from the decomposition of this food in the organism seeming to act as a muscular poison.

In order, then, to keep the balance true, and supply the wants of the various tissues without having any excess of waste products, we must have an admixture of various kinds of food, and if one or other be deficient, we either throw additional work upon the organism by making it consume more than a fair share of another sort, and excrete the residue which it does not want, or the tissues and organs which must require the missing food will suffer in consequence. Now, the food which is more frequently deficient than any other is fat, and this may be either because the fat cannot be obtained, or because it cannot be digested. The late Dr. Hughes Bennett used to say that two of the main causes of tuberculosis were the dearness of butter and the abundance of pastrycooks. For fat is an expensive article of

diet,—well-fed meat is dearer than badly fed and lean meat. Butter is expensive, and amongst poor families its place is very often taken by molasses or jam, which no doubt gives a relish to the bread, and is enjoyed by the child, but does not supply the place of butter as a food. Hence, amongst the lower classes, both children and adults suffer because they are unable to obtain a sufficient proportion of fat in their food. The pastrycooks whom Dr. Bennett accused of causing tuberculosis amongst the upper classes, did it, he said, by disordering the digestion, of young girls especially, by puff-paste, and other things of that sort, and thus spoiling their appetite for food and especially for the fat which they might obtain in abundance if they liked. The result is the same in both classes, for unless the fat be absorbed and assimilated, the result is the same as if the patient could not obtain it. But we notice that in both upper and lower classes there are numbers of children who refuse fatty food, although their parents or guardians are sufficiently careful to prevent them from injuring their digestions by puff-paste, or anything of the kind. There are many children who will utterly refuse to eat a piece of fat meat. They will eat the lean, but carefully cut off every scrap of fat, and lay it at the side of the plate, and will submit to severe punishment rather than eat it. Some persons are in favour of punishing such children, and compelling them to eat fat, but such a course I regard as a total mistake. The instinct of the child is perfectly right, and its indications ought not to be disregarded. If the fat be swallowed under compulsion, it generally disagrees with the child, and makes it sick, as the poor thing well knows. In such cases the proper thing to do is to give the fat in another form. If any one of us were to swallow a lump of butter, by itself, it would very probably make us sick; but if we spread the same butter upon pieces of bread, we can take it not only without discomfort, but with enjoyment. Professor Hugo Kronecker once illustrated this to me very strikingly. He said: "Suppose you get a piece of butter, and are asked to make a sandwich, would you take the whole of the butter, spread it on one slice of bread, and then put the other unbuttered slice on the top of it? If you did, your sandwich would not be half so palatable as if you

divided your butter, spread it upon both slices, and then put them together." The reason of this is simple, for in the latter case we get the fat in a much finer state of subdivision, and the more finely it is subdivided, the more do we enjoy it, and the more readily is it digested. A piece of solid butter swallowed alone would melt in the stomach, float about without undergoing digestion, and would probably begin to decompose and yield acrid fatty bodies, which would irritate the stomach and cause sickness. When finely divided by admixture with particles of bread, it would form a creamy mass, which would quickly pass into the duodenum, and be digested and absorbed. In the same way, these very pieces of fat which a child will cut from its meat and put aside, may be rendered quite palatable by being mixed with flour or potatoes. A piece of fat bacon, or the liquid fat in the plate, which would certainly make the child sick if swallowed alone, will be taken with great relish if chopped up finely and well mixed with a mashed potato. Whatever the fat may be which we wish a person to swallow, we should endeavour, by every means in our power, to subdivide it minutely, if there be the least difficulty in digesting it. Besides this, we ought to seek to maintain this state of subdivision in the stomach. For although the fat may be finely subdivided at the time it is swallowed, yet during its sojourn in the stomach it may be melted by the warmth of the body, and the globules gradually agglomerating may again form a solid mass, which will have somewhat the same effect upon the stomach as if it had been swallowed in a solid mass at first. For this reason I think it is advisable, in administering cod-liver oil, to give it an hour or so after, instead of immediately after a meal, because it will then have a shorter time to stay in the stomach, and will pass out quickly into the duodenum. I think it is better to give cod-liver oil in the form of an emulsion, with gum acacia, rather than with solution of potash or carbonate of potash, because the gum is little, if at all, affected by the gastric juice, whereas the potash will be neutralized, and its emulsifying properties destroyed, so that the particles of oil can again run together. This emulsion with gum acacia is borne by many persons who cannot take pure cod-liver oil, and with whom the potash emulsion also dis-

agrees. Besides the differences in the digestibility of fat due to the mechanical condition of aggregation or subdivision, there are differences also which are due to their chemical composition. Thus, mutton fat is difficult of digestion, while pork fat is easily digested. Butter, too, can be readily taken, and is greatly enjoyed by some persons who cannot take other sorts of fat; and cod-liver oil is usually very well borne, and very easily assimilated. Many opinions have been advanced regarding this ready digestibility of cod-liver oil, and some have sought for its cause in the fact that this oil contains propylene in combination with fatty acids instead of glycerine, like most other fats. Others, again, have attributed it to the minute quantities of iodine, and others to the biliary matters which are found in the oil. The last seems by far the most reasonable supposition. For it has been shown by Neumann that oil of any sort will pass much more readily through a filter, or through an animal membrane moistened with bile, than through one moistened with water. This is still further borne out by the fact which the late Dr. Hughes Bennett used to mention in his lectures, and which has recently been confirmed by the observations of my friend Dr. Russell, that the coarser kinds of cod-liver oil, though more disgusting to the taste, are sometimes more easily digested than the paler and so-called better qualities. These coarse oils are obtained from livers which have been longer exposed to heat, and contain more of the biliary substances. But it is not improbable that the peculiarity in the chemical composition of the oil which I just now mentioned, may have also something to do with its digestibility and utility. The remark of the old nurse quoted by Weir Mitchell, that cod-liver oil fat was soon squandered, seems to point to the greater mobility, if we may so term it, of the cod-liver oil than of other fats, so that it is both more readily laid on and more readily reabsorbed from the tissues than other fats. Perhaps it is to this greater mobility that the beneficial effects of cod-liver oil, as compared with those obtained from the use of other fats, such as butter, are to be ascribed. In a former part of this paper I observed that the quantity of fat circulating in the blood could be greatly increased by food. Now it may not matter very much to tissues of tolerable permanency, such as the subcutaneous fat, what the fatty substances in the

blood may be, as time is allowed for these substances to undergo any necessary modifications before they become deposited in the permanent adipose cells. But the case may be different with mobile tissues, such as the colourless blood corpuscles, which are going to form pus, or with the rapidly developing young cells which help to compose the muco-purulent expectoration in bronchitis. For these it may be a matter of great importance that the fat should be easy of assimilation, the time allowed for such assimilation before the cells are thrown off being very limited.

Some time ago I went to a lecture on sick-room cookery. The lecturer described and demonstrated the different methods of preparing gruel, and observed that whenever the gruel was required for a case of bronchitis, a piece of butter should always be added to it, "because," said she, rubbing her chest with her hand, "butter is so very healing to the inside." She was evidently under the impression that the piece of butter got into the chest, ran all about, and thoroughly greased the air-passages. Her notions of physiology were very confused, but I think her practical observation was perfectly correct. It appears to me that in bronchitis, both acute and chronic, a little cod-liver oil is generally much more serviceable than cough mixtures, and patients express themselves very grateful for the relief which it affords by lessening the cough. Indeed, in many cases of chronic bronchitis, it seems to me to be almost the only remedy which affords any marked relief. The use also of this oil in phthisis is now so universal that I need say nothing about it, but I will pass on to consider the use of fats as a nervous food. I have read that a well-known barrister always swallowed a large dose of cod-liver oil before going to plead a case, because it enabled him to do better mental work than anything else he could take. I myself, after a trial of various things, have come to the conclusion that fat bacon is one of the most satisfactory things upon which to do hard mental work, and I invariably take it for breakfast whenever I have first to see a number of patients and afterwards to deliver a lecture. We have already seen that the nervous system contains a very large proportion of fat, and we can well imagine that if fat be deficient from the food, that system must necessarily suffer; and more

especially is this likely to be the case if, in addition to the deficiency of fat, we have an excess of the products of nitrogenous waste, such as we get from an almost exclusively animal diet. A distinguished physician has made the observation that the prevalence of Bantingism has thrown a great number of nervous cases into the doctor's hands, and a friend lately narrated to me the case of a relative of his own who used to suffer from undefined nervous symptoms. Sometimes he sat and moped about all day, simply because he felt that he could not go out alone, and that he was unable to do anything. He would sometimes start for a walk, and after proceeding a short distance, would turn back again. He lived to a great extent on animal food, and, notwithstanding this disinclination to go out alone, he took a great deal of exercise, both hunting and shooting, so that his symptoms were neither due to want of food nor lack of exercise. Some time afterwards he went to Ireland, and whilst there lived on very fat meat and whisky. All the time he did this he felt perfectly well, but whenever he came back and resumed his animal diet, the symptoms returned.

In persons of a gouty temperament, living to a great extent on animal food, especially when they reach middle age, we not unfrequently observe sugar in the urine. It is, I think, a mistake to term this diabetes; it should rather be called gouty glycosuria. The cause of it appears to be that the oxidation in the body is insufficient to consume all the substances taken in as food, and one or other of them must needs undergo imperfect combustion. Accordingly we find that it is sometimes the nitrogenous products of waste which pass out in a state of imperfect oxidation, large quantities of uric acid and urates appearing in the urine instead of urea. At other times it is the non-nitrogenous products, such as sugar and fat, which escape oxidation, the uric acid being absent from the urine whilst sugar appears, or both uric acid and sugar may be wanting, and fat is accumulated. These processes of imperfect oxidation seem to be very closely connected indeed, for Seegen has noticed, in his work on diabetes, that the disease is often preceded or accompanied by an immense accumulation of fat, so that one patient, who went to be under his treatment at Carlsbad, had actually to be conveyed in a luggage van instead of an ordinary

railway carriage. We also notice very frequently that the gouty glycosuria of middle age occurs in stout persons. The same deficiency in oxidation which leads to the accumulation of fat in the subcutaneous cellular tissues, or about the viscera, may also lead to fatty degeneration of organs. The pathology of fatty degeneration has been exceedingly carefully worked out by Voit and Bauer, and the method they adopted was to study the changes which took place in animals during phosphorous poisoning. It is well known that after poisoning by phosphorus the organs of animals are found to be in a state of intense fatty degeneration, and the question which Voit and Bauer tried to solve was, "Whence did this fat come?" It might, they said, have come from the food, or it might have been absorbed from the subcutaneous cellular tissue and deposited, for example, in the liver, or it might have been formed in the liver and other organs from the albuminous constituents of these organs themselves. They solved the question in the following way:—they starved a dog until all its fat had completely disappeared, and then poisoned it with phosphorus, and at its death its organs were found to be in a state of exquisite fatty degeneration. The fat here could not have come from the food, for the animal got none; it could not have been absorbed from the subcutaneous cellular tissue and deposited in the liver, for all the subcutaneous fat had gone before the phosphorus was administered. It must therefore have been formed *in situ*, from the albuminous constituents of the organs themselves. So much being ascertained, they had next to discover whether the fat was due to increased tissue change, or diminished oxidation. The albuminous constituents of the organs, they considered, were split up into some nitrogenous substance, and into fat. Normally, both of these undergo oxidation, the nitrogenous substances into urea, and the fat into carbonic acid and water, the splitting up of the tissue and the oxidation going on nearly *pari passu*. If the tissues split up too rapidly for the products of their decomposition to be oxidised, it is obvious that we shall either have the fat accumulating, or the nitrogenous products imperfectly oxidised, as, for instance, in the case of fever, or of gouty glycosuria. If the amount of oxygen received by the tissues be diminished below the normal, a similar result

will occur. In phosphorous poisoning both of these were observed, for the urea was greatly increased, showing that the nitrogenous tissues were split up more rapidly than usual, while the amount of carbonic acid exhaled was diminished, showing that the combustion going on in the body was less than usual. The combustion of the tissues is kept up by the oxygen carried to them from the lungs by the red-blood corpuscles, and whenever the supply of oxygen to the tissues is diminished, either by impoverishing the blood of these corpuscles, or by lessening the flow of blood through the part, accumulation of fat or fatty degeneration is likely to ensue. This fatty accumulation from insufficient oxidation may sometimes be observed in women after severe flooding, the patient becoming exceedingly anæmic, and at the same time very fat. The fatty degeneration due to insufficient oxidation is seen in the muscles of a paralysed limb, where want of exercise has nearly stopped the flow of blood, or in the heart, where the coronary arteries have been rendered too small for the normal heart by calcareous degeneration, or where the hypertrophied heart has grown too big for these arteries to supply it. This fatty degeneration of the heart is frequently met with in persons of a gouty habit, tending to become fat, and at the same time suffering from bronchitis, sometimes complicated by emphysema. In treating such persons the question arises, "Does a fatty condition of the heart, and the tendency to accumulate fat under the skin contraindicate the use of the cod-liver oil which might be beneficial to the bronchitis?" For my own part I am inclined to say no. It is quite true that the oil, after being absorbed, will very probably undergo oxidation more readily than the fat which has been forming in the tissues, but it may be nevertheless beneficial by supplying the wants, not merely of the young cells in the bronchial tubes, which form the expectoration, but by supplying the wants of the nervous centres. In such cases I sometimes give cod-liver oil, notwithstanding the fatty condition of the heart, and trust to increase the oxidation by administering iron so as to increase the number of the red-blood corpuscles, at the same time trying to eliminate some of the waste materials by keeping the bowels freely open.

If I were to pursue this subject into all its ramifications, I should take up more time than could be allotted to several papers such as this; and therefore in the present one I have merely attempted a slight sketch of some of the more prominent uses of fat, and tried to give a few hints derived from physiological observation, and confirmed, I feel certain, by the experience of many medical men regarding the method of administering fats, and the diseases in which fat is chiefly serviceable.

ON THE USE OF SULPHUROUS ACID IN SOME FORMS OF EAR-DISEASE.

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THE reading of a communication in these pages some time ago (by Dr. Fergus of Marlborough) "On Sulphur and Sulphurous Acid," caused me to institute some experiments with this acid, the results of which I now desire to lay before the profession, and more particularly that portion of it specially interested in the subject of ear-diseases.

The impression that I had on reading the communication referred to was, that in the use of sulphurous acid I had found at last something wherewith to combat successfully the worst cases of that large class of chronic ear-diseases which have been allowed to run on unchecked by any treatment, and which are usually complicated with ulcerations of the soft as well as of the osseous structures of the organ.

Although my expectations in this respect have not been realised, I have found the acid to be of great service in cases of chronic catarrhs of the nasal passages—a statement that, I am sure, will afford pleasure to those who, like myself, have to do battle with these too often intractable nasal affections.

Hitherto, in these cases of chronic disease of the middle ear I had employed the local use of alcohol of various degrees of strength, and with marked and almost invariable success; but now and again a case would be met with that refused to yield to it, and hence my outlook for some other thing likely to suit these cases, in which the alcohol was inoperative.

The experiments that I undertook were partly chemical and in part clinical.

A sample of B.P. sulphurous acid was obtained of sp. gr. 1·018. It contained 1·84% by weight of sulphurous acid gas (SO_2) and ·35% of sulphuric acid (SO_3) also by weight.[1]

A portion of the acid was placed in a shallow vessel and loosely covered. After twenty-four hours' exposure thus, it smelled moderately strongly of the gas; in forty-eight hours the smell had become very faint, and in three days it had altogether disappeared. To prove that this change was due, as I supposed, to the gradual conversion of the SO_2 into SO_3 by the abstraction of the necessary O from the surrounding air, the following experiments were performed:—

1*st Experiment.*—Sulphurous acid, which before exposure to the air contained per cent. by weight of SO_2, 1·84—and of SO_3, ·35—(2*nd experiment*)—had after being exposed for twenty-four hours—SO ·04—SO_3 ·37—(3*rd experiment*)—and exposed for forty-eight hours—SO_2 ·013—SO_3 ·370. The conversion is here seen to occur but slowly compared with that which takes place when the acid is placed in the human ear, as I shall by and by show.

A case of otitis media purulenta in the third stage and active, complicated not only with polypi and polypous granulations, but with caries of the mastoid, was selected as a typical case upon which to experiment.

After cleansing the ears from all discharge, and the tissues therefore being left to the free action of the acid, the external meatus was filled with it and the air excluded. The following were the subjective phenomena. At first hardly any sensation, till at the end of a minute, when pain was felt distinctly and increasing. At the end of the second minute this pain became pretty severe and requiring some courage to bear. The acid was now removed, and after its removal from the ear of the patient he said that he felt a sensation of weakness in the whole organ, but the hearing, already impaired before experimenting, was not made worse by the use of the acid.

Examination of the tissues after this experiment showed that

[1] This, I am informed, is only about one half the usual strength of the best acid as found in the shops.

they were generally whitish in colour, and that, in some parts, the blanched epithelium was peeling off.

Suspecting that this effect on the tissues, together with the nature of the pain that the application of the acid caused, were due to an increase in the quantity of the sulphuric acid already in the solution, I next proceeded to experiment in order to determine if my suspicions were well founded.

With that object the proportions of SO_2 and SO_3 in the solution of sulphurous acid gas were determined beforehand, and the changes in its composition noted after the acid had lain in the ear for one and two minutes respectively. These experiments are as follows :—

1st Experiment.

Before being placed in ear solution of acid contains . . .	SO_2 . .	·720
	SO_3 . .	·060

2nd Experiment.

After being one minute in ear the solution contains . . .	SO_2 . .	·432
	SO_3 . .	·140

3rd Experiment.[1]

After being two minutes in ear the solution contains . . .	SO_2 . .	·319
	SO_3 . .	·200

The blanching of the tissue therefore, and the pain also, seem clearly to be the result of the increase in the quantity of the sulphuric acid originally in the solution; the increase of this acid being due to the abstraction of the oxygen from the tissues —differing in this respect from the action of permanganate of potass on similar tissues, which yields up its oxygen to them, and with the use of which there is neither pain nor blanching of the tissues of the organ.

From these experiments it may be at once seen that a solution of sulphurous acid gas in water, placed in contact with congested tissues, speedily becomes changed into a very dilute sulphuric acid, and that probably the effect that is exerted upon these tissues is due to the action of the sulphuric acid rather

[1] The above experiments were not all made on the same day.

than to that of the sulphurous. Whether this be so or not, and whether or not there may be good in the process of oxidation by which this conversion of acids is effected, concerns me not much, viewed from a practical standpoint. For a prolonged general use of this acid in the treatment of the class of cases for which I considered it to be suitable, and which I was trying while these more exact experiments were being carried out, enables me to say that, in my hands, it has not answered any good purpose.

Indeed, in one or two cases I think I am just in deciding that it caused some mischief; at all events it possesses no virtue in such cases not possessed by pure alcohol.[1]

[1] Concerning the use of alcohol in ear-diseases, see my paper on this subject in the *Lancet* of 25th April, 1874.

NOTE ON SULPHUROUS ACID IN SCARLET FEVER.

BY L. D. WATERMAN (INDIANOPOLIS, INDIANA).

DURING 1876 a severe, but not greatly-extended, epidemic of scarlatina occurred in this city. In several families five, in others four, and in others three children died. I early adopted, on antizymotic principles, the administration of from 10 to 30-drop doses, every two, three, or four hours, of *sulphurous acid* diluted. I treated eleven *severe* cases. The ten treated after its adoption recovered; though cervical abscess, beginning in a lymphatic gland, occurred in one case, and one case recovered after six weeks of great inanition. My first case died in forty hours from the chill, with cerebral congestion; and the temperature before death rose to 105° (axillary), despite the cold bath. The number of cases is too few, but the careful study of the epidemic and comparative results have given me some faith in the sulphurous acid in this disease, and much hope. It has not established such in general *diphtheria*. I observed no marked sudden reduction of temperature from its administration. I add tonics and hyper-acidulated chlorate of potash every fifteen minutes.

THE PHYSIOLOGICAL ACTION OF ACONITE.

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(*Continued from* 109.)

From the preceding experiments in reference to the action of aconite on the nervous system, the following deductions may be made :—

1. *It induces paralysis of the peripheral sensory nerves, the sensory nerve-trunks, and posterior (sensory) nerve-roots.*—The evidences of this are witnessed in the progressive diminution of power of conduction of the afferent nerves, commencing at the periphery and subsequently extending along the nerve-trunk to the nerve-root. To this sensory paralysis is probably due the ataxic gait, inco-ordinate movements, and diminished power of locomotion in aconitised animals. There is reason to believe, however, that paralysation is not the primary effect of the action of the drug on the sensory nerves, but that it is preceded by a period of hyper-excitation or irritation. This feature is especially prominent in dogs, which, during the early stages of aconitism, give evidence of considerable cutaneous irritation, especially in the posterior limbs. The primary stage appears to be of uncertain duration, and during its continuance reflex action seems normal. It may be the only sensory effect produced (mild aconitism), and may with safety be induced therapeutically.

2. *The irritability of the motor nerves is augmented.*—That this is the case is shown from their excitability being invariably of greater intensity and longer duration in the aconitised frog when tested with another in its normal condition. The poisoned motor-nerves of a batrachian also show greater irritability than those protected by ligature from the action of the drug. The

degree of motor-nervous irritability present in aconitism may be summarised as comprising three stages:—(1) Primary hyper-excitation; (2) Exhaustion, the result of the first stage; (3) Secondary hyper-excitation. These results were obtained after repeated experimentation, and are directly antagonistic to those arrived at by Achscharumow, whilst they confirm to a certain extent those of Böhm and Wartmann, with this distinction, that the latter believed the excitability of the nerves and muscles in aconitism to be merely normal.

3. *The cerebro-spinal axis is variously affected, the functions of the cerebrum being unimpaired, the posterior (sensory) columns of the cord being also unaffected, and the anterior (motor) columns having their irritability greatly increased.*

As already stated, the author has been unable to detect cerebral paralysis as one of the conditions obtaining in aconitism, but, on the contrary, has invariably observed such an amount of intelligence present, even during the most profound stages, as to forbid the idea that it can be present to any great extent. He is not inclined, therefore, to agree with the idea of Liegois and Hottot as to the paralysation of a perceptive cerebral centre. The absence of paralysis of the cerebral motor centres is indicated by their ready muscular response on electrical and mechanical stimulation. From the fact that the posterior columns of the cord maintain their normal irritability after the paralysation of the sensory nerves, and sensory nerve-roots, and that the degree of muscular movement induced by their excitation is about as great as by the direct irritation of the muscles themselves, it is evident that, in aconitism, their condition is one of non-paralysation. The sensory paralysis present, therefore, is apparently of a non-spinal nature, both in its primary manifestation and ultimate development. The condition of the motor columns of the cord is one of hyper-excitation, as demonstrated by the greatly augmented severity of the convulsions on the cord being released from the control of the inhibitory centre by section of the medulla, by their idiopathic occurrence, and general nature. Intermittent convulsive spasms invariably follow the administration of the tincture in poisonous doses, whilst hypodermic injections of strong solutions of the alkaloid frequently do not markedly induce them.

The author is unable to account for the statement of Böhm and Wartmann (already quoted), that increased reflex action does not occur in frogs poisoned by aconite, when released from the control of the inhibitory centre, for he has invariably found *excessive* muscular action to be the result of the above operation in aconitised frogs. This effect has been so frequently obtained by him as to place its existence beyond doubt, and he can only conclude that the authors above named had used spurious preparations of the alkaloid in their experiments.

The absence of motor phenomena spoken of by Wood as being especially common in dogs can only be accounted for in the same way. In the present series of experiments it was noticed that the administration of the alkaloid was not followed by such precise effects as characterised the exhibition of carefully prepared tinctures, doubtless owing to the presence of some impurity or pseudo-alkaloid.

II.—Action on the Respiratory System.

The degree of implication of the respiratory system is one of the earliest, most invariable, and most prominent features of aconitism.

1. *In the Frog.*—In small doses the respirations are rendered irregular and deep, with pauses equal to two or three ordinary respirations occurring at irregular intervals. Their number is diminished, though sometimes they become quick and shallow, and frequently spasmodic. These changes are manifested in periods varying from immediately to about five minutes after the injection. In larger doses the effect is soon witnessed in the complete abolition of the respiratory act, the diaphragm continuing to act after the muscles of the nares have ceased. Previous to complete abolition the respirations are only two to three per minute, and with a complete cessation for two to three minutes. The cardiac pulsations invariably continue, frequently for hours, after the abolition of respiration.

2. *In the Dog.*—Here the first effect, in large doses, is a fall in the number of the respirations. This fall always takes place if the dose be large enough, and its degree is, as a rule, always proportionate to the largeness of the dose. It sometimes is slight, and may be preceded by a rise. In addition, however,

to this numerical alteration, the whole character of the respiratory act becomes changed. In a dog (Experiment XII.), after subcutaneous injection of three minims of Fleming's tincture, profuse ptyalism ensued;[1] the respirations gradually became deeper and laboured, and accompanied by spasmodic hiccough. Attacks of complete inability to inspire occurred nearly every minute, when the thoracic muscles were contracted and approximated, the abdominal muscles firmly contracted, the limbs quivered, and several violent abortive attempts to breathe were made. This condition of asphyxia continued for from fifteen to twenty seconds, and was relieved by the forcible descent of the diaphragm. In the intervals the performance of the respiratory act was mainly due to the extraordinary efforts on the part of the thoracic and abdominal muscles. These spasmodic attacks of asphyxia continued for nearly three hours. In smaller doses the respirations still undergo a numerical fall, becoming at the same time deeper, somewhat laboured, and with prolonged expiration. In still smaller doses the numerical fall may be all that occurs, and even this may scarcely be perceptible.

3. *In the Rabbit.*—After a poisonous (non-fatal) dose the number of the respirations is steadily and rapidly diminished, remaining low during the development of the aconitism, and becoming augmented towards recovery. In some instances the primary fall is slight and transient, and separated from the more marked and permanent one by an interval of numerical increase. In the rabbit, as in the dog, the whole character of the respiratory movement undergoes marked changes. It first becomes forced and laboured, and the diaphragm and abdominal muscles are called upon to redouble their exertions. The respiratory difficulties increase, and the animal appears to suffer from transient fits of choking, as shown by the wild manner in which it jerks and tosses its neck. Spasmodic attacks of asphyxia supervene, the animal makes wild attempts to inspire, and becomes generally and violently convulsed.[2] The pupils at this time are dilated. Towards recovery, the spasmodic attacks pass off, and the respiration continues deep, with a pause at the

[1] This symptom—profuse ptyalism—is almost general during aconitism.

[2] Dilatation of the pupil occurs only during the spasmodic asphyxia of aconitism, and does not appear to be directly due to the action of the drug.

end of expiration. Should the dose prove fatal, the animal expires in one of the convulsive attacks.

Experiment X.—Healthy male frog, poisoned by the subcutaneous injection of one minim B. P. Tinct. Aconiti.

Respirations		before injection,	96	per minute.	
„	5 minutes	after	„ 35	„	„
„	10 „	„	„ 32	„	„
„	15 „	„	„ 36	„	„
„	20 „	„	„ 52	„	„
„	25 „	„	„ 35	„	„
„	30 „	„	„ 43	„	„
„	45 „	„	„ 2	„	„
„	60 „	„	„ 6	„	„
„	75 „	„	„ 7	„	„
„	90 „	„	„ 2	„	„
„	2¼ hours	„	„ 3	„	„
„	5 „	„	„ 1	„	„
„	12 „	„	„ 86	„	(Recovery.)

Observations on Experiment.—The result of this was to show a rapid interrupted fall in the number of respirations and their almost complete abolition, with a corresponding rise towards recovery.

Experiment XI.—Healthy male frog, with subcutaneous injection of ½ minim B. P. Tinct. Aconiti.

Respirations		before injection,	96	per minute.	
„	2 minutes	after	„ 60	„	„
„	10 „	„	„ 62	„	„
„	15 „	„	„ 25	„	„
„	20 „	„	„ 50	„	„
„	25 „	„	„ 34	„	„
„	30 „	„	„ 50	„	„
„	45 „	„	„ 70	„	„
„	1 hour	„	„ 80	„	„
„	1¼ hours	„	„ 84	(Recovery).	
„	1½ „	„	„ 100	„	
„	3½ „	„	„ 110	„	

Observations on Experiment.—The result of this was a rapid fall, of short duration, in the number of respirations.

Experiment XII.—Dog, weighing 14lbs. with a subcutaneous injection of 3 minims of Fleming's tincture.

Respirations			before injection,	25	per minute.
,,	15 minutes	after	,,	18	,, ,,
,,	30 ,,	,,	,,	10	,, ,,
,,	45 ,,	,,	,,	9	,, ,,

An interval of 3¼ hours now elapsed, when the respirations could not be counted, on account of the frequency of the spasmodic convulsive attacks, when the animal failed to inspire, even after the most violent attempts.

Respirations	4½	hours after	injection,	40	per minute.
,,	6	,,	,,	32	,, ,,
,,	8	,,	,,	26	,, ,, (Recovery).

Observations on Experiment.—This showed a diminution in the number of respirations, with complete alteration of character, becoming at first laboured, and subsequently interrupted by frequent spasmodic paroxysms, when inspiration could not be performed for several consecutive seconds.

Experiment XIII.—Dog, weighing 14lbs. with subcutaneous injection of $\frac{1}{200}$ gr. aconitia (Smith's).

Respirations			before injection,	24	per minute.
,,	15 minutes	after	,,	22	,, ,,
,,	30 ,,	,,	,,	22	,, ,,
,,	45 ,,	,,	,,	18	,, ,,
,,	1 hour	,,	,,	24	,, ,,
,,	1¼ hour	,,	,,	24	,, ,,

Observations on Experiment.—The only result shown was a diminution in the number of respirations with no appreciable alteration in character.

Experiment XIV.—Dog, weighing 14lbs. with a subcutaneous injection of $\frac{1}{300}$ gr. aconitia (Smith's).

Respirations			before injection,	18	per minute.
,,	15 minutes	after	,,	12	,, ,,
,,	30 ,,	,,	,,	11	,, ,,
,,	45 ,,	,,	,,	12	,, ,,
,,	1 hour	,,	,,	13	,, ,,
,,	2 hours	,,	,,	17	,, ,,
,,	3 ,,	,,	,,	18	,, (Recovery).

Observations on Experiment.—The only observable effect was a diminution in the number of respirations. (NOTE.—Evidently an instance of the use of an impure alkaloid.)

Experiment XV.—Dog, weighing 14lbs. with a subcutaneous injection of $\frac{1}{400}$ gr. aconitia (Smith's.)

Respirations		before injection,	25	per minute.	
„	7 minutes	after „	28	„	„
„	15 „	„ „	30	„	„
„	30 „	„ „	28	„	„
„	45 „	„ „	22	„	„
„	1 hour	„ „	28	„	„
„	1½ hour	„ „	25	„	(Recovery).

Observations on Experiment.—The results attained were alternations of increase and decrease in the number of respirations.

Experiment XVI.—Dog, weighing 14 lbs. with $\frac{1}{10}$ gr. aconitia (Smith's), given by the stomach.

Respirations		before injection,	25	per minute.	
„	15 minutes	after „	24	„	„
„	30 „	„ „	34	„	„
„	45 „	„ „	26	„	„
„	1 hour	„ „	28	„	„
„	1¼ hour	„ „	26	„	„
„	1½ „	„ „	22	„	„
„	1¾ „	„ „	24	„	„
„	2 „	„ „	20	„	„
„	2½ „	„ „	18	„	„
„	3 „	„ „	16	„	„
„	4½ „	„ „	18	„	„
Respirations could not be counted on account of spasms.					
„	5 hours	„ „	20	per minute.	
„	5½ „	„ „	24	„	„ (Recovery).

Observations on Experiment.—The prolonging of the occurrence of the respiratory fall was probably due to the delay in absorption of the drug, as compared with those instances in which it was administered hypodermically. The respirations gradually became more laboured and difficult of accomplishment.

A quantity of the poison was probably removed by the vomiting $4\frac{1}{2}$ hours after its administration.

Experiment XVII.—Rabbit, weighing 3 lbs., with subcutaneous injection of $\frac{1}{402}$ gr. aconitia (Smith's). The respirations, from being 140 before the injection, fell in six minutes to 116, and in eighteen minutes to 78. During the succeeding four hours they varied from 78 to 100, and were generally laboured and abdominal, with slight convulsions during the impeded inspirations. About three hours from commencement of experiment they became easier, and less abdominal in character, and four-and-a-half hours after injection, seemed of normal character.

Observations on Experiment.—The animal was carefully watched during the whole of this experiment ($5\frac{1}{2}$ hours), and the main symptoms throughout were observed to be entirely due to impeded respiration. Beside the numerical fall, there was noticed a marked intermittent inability to inspire, entailing the most frantic efforts on the part of the animal, and lasting for from ten to thirty seconds. The nature of this respiratory difficulty will be subsequently discussed.

Experiment XVIII.—Rabbit, weighing 2 lbs. 15 oz., with subcutaneous injection of $\frac{1}{720}$ gr. aconitia.

Respirations				before injection,	22	per minute.	
„		6 minutes	after	„	29	„	„
„		14	„	„	26	„	„
„		20	„	„	18	„	„
„		29	„	„	23	„	„
„		35	„	„	35	„	„
„		45	„	„	31	„	„
„		53	„	„	31	„	„
„	1 hour		„	„	33	„	„
„	1 „	10	„	„	26	„	„
„	1 „	20	„	„	23	„	„
„	1 „	40	„	„	19	„	„
„	1 „	50	„	„	21	„	„
„	2 hours		„	„	16	„	„
„	$2\frac{1}{4}$ „		„	„	17	„	„
„	3 „		„	„	18	„	„
„	3 „	20	„	„	19	„	„
„	$4\frac{1}{2}$ „		„	„	14	„	„
„	$5\frac{1}{2}$ „		„	„	25	„	(Recovery).

Observations on Experiment.—The respirations were affected antecedent to the cardiac pulsations, their number being firstly increased, secondly diminished, with a subsequent increase and diminution occurring before the final increase towards recovery. In character, they became deep and laboured, and interspersed with several slight suffocative spasms.

In all experiments the presence of the respiratory embarrassment was clearly indicated, and was the most prominent feature displayed. In fatal cases the dyspnœa gradually increased, complete asphyxia ensued, and the animal expired, making the most frantic efforts to breathe, and being violently convulsed. The next experiment was made with the view of ascertaining to what extent the operation of tracheotomy might be of service in preventing or modifying the suffocative spasms.

Experiment XIX.—Rabbit, weighing 2lbs. 3oz., poisoned by the subcutaneous injection of $\frac{1}{240}$ grain aconitia. (Tracheotomy was performed prior to the exhibition of the drug.)

Before injection, the respirations were 36 per minute; 7 minutes after, respirations 24 per minute, with a pause at the end of expiration: gentle irritation of the tracheal mucous membrane induced reflex convulsive movements; 15 minutes after injection, respirations 12, very laboured, with severe convulsive movements; $22\frac{1}{2}$ minutes after injection, respirations 64: reflex movements not so readily induced as formerly, by irritation of tracheal mucous membrane; 35 minutes after injection, respirations 24, with severe suffocative spasms; 45 minutes after injection, respirations 100: no reflex movements on irritation of mucous membrane of trachea; one hour after injection, respirations 54: the closing of the orifice in the trachea made no difference in the number or general character of the respirations; on irritation of the mucous membrane of the trachea no reflex movements were induced; the animal was quite conscious in the intervals between the convulsive suffocative spasms. An hour and a half after injection, respirations 52, with great dyspnœa, not increased by carefully closing the tracheal orifice. An injection of $\frac{1}{120}$ grain aconitia was now given, and the animal expired in 15 minutes afterwards in the last of a series of suffocative convulsive spasms.

Observations on Experiment.—In this instance tracheotomy, and the insertion into the trachea of a specially prepared

canula, did not prevent or retard the development of the usual respiratory symptoms of aconitism. The suffocative paroxysms also underwent no alteration in character on the withdrawal of the tube and the careful closing of the tracheal opening. Another leading feature observed during the experiment was the diminution, and subsequently, complete abolition, of sensibility in the mucous membrane of the trachea. During the earlier part of the experiment very gentle irritation of this membrane, by means of a small camel's hair pencil inserted through the tracheal orifice, was followed by excessive muscular movement;—22½ minutes from the commencement of the experiment the power to induce reflex movements in this way was decidedly diminished, and, 45 minutes after injection, was completely lost, and continued so until the death of the animal. Throughout the whole experiment the animal remained conscious during the intervals between the attacks of dyspnœa.

The next experiments were undertaken with the view of ascertaining to what, if any, degree, the usual symptoms of aconitism might be modified by section of the vagi.

Experiment XX.—Chloralised rabbit, weighing 2 lbs. 9 oz., with subcutaneous injection of $\frac{1}{240}$ and subsequently of $\frac{1}{60}$ gr. aconitia. Before injection, the respirations were 56 per minute, falling rapidly to 16, 8 minutes after the administration of the drug, and becoming laboured and abdominal, with a prolonged pause at the end of expiration. At this period the vagi were divided. The immediate effect of this was to produce no perceptible effect in the character or number of the respirations. Seven minutes after section, their number remained unaltered (16); 9 minutes after section, a rise to 26 took place, and a fresh injection of $\frac{1}{60}$ gr. aconitia was given; 12 minutes after section, prolonged general violent convulsions occurred, during which the animal expired. Tracheotomy was immediately performed, and artificial respiration maintained for some time, but without producing any effect.

Observations on Experiment.—The immediate effect of section of the vagi during the development of aconitism was to produce no appreciable effect in the character or number of the respirations. In this experiment an early and rapid respiratory fall

was the direct consequence of the exhibition of the drug, and was not modified by section of the nerves. The convulsions usually present in aconitism were also developed to a very marked extent. The experiment also shows the inutility of tracheotomy and artificial respiration in fatal aconitism.

Experiment XXI.—Chloralised rabbit, weighing 2 lbs., with a subcutaneous injection of $\frac{1}{240}$ and subsequently of $\frac{1}{60}$ gr. aconitia, the vagi being divided antecedent to the administration of the drug. Section of the vagi was followed by a considerable fall in the number of respirations. Before injection (vagi divided), respirations 26 per minute. Six minutes after subcutaneous injection of $\frac{1}{240}$ gr. aconitia, respirations 22, with very markedly prolonged expiration. Eight minutes after injection, respirations 28 (an injection of $\frac{1}{60}$ gr. aconitia was now given). From 2 to 12 minutes after second injection they remained at 24, with a prolonged pause at the end of expiration; a rapid and continuous fall then ensued, ending in the complete abolition of the respiratory movement 30 minutes from commencement of experiment.

Observations on Experiment.—After subcutaneous injection of aconitia in an animal with divided vagi, the number of respirations is slightly diminished, but may (as in experiment) be subsequently increased to a greater number than before the administration of the drug. The chief characteristics of the respiratory movement in the present instance, in addition to the numerical alteration already mentioned, were the very prolonged expiration and the lengthened pause which succeeded it; both of which became gradually intensified as the aconitism deepened. The animal was deeply chloralised, and remained perfectly quiescent and free from convulsions during the whole of the experiment.

(*To be continued.*)

ON THE CAUSES AND TREATMENT OF DROWSINESS.

BY J. R. GASQUET, M.B.[1]

In choosing for the subject of this paper that excessive tendency to sleep which we term drowsiness, I shall probably seem to be dwelling unduly upon a symptom of no great importance. But I have selected it because it is a good example of the number and complexity of the conditions under which most of the symptoms of nervous disorder are produced; and yet, when these are unravelled, it will be found that, however diverse and even opposite they may appear, they may be accounted for on some general principle which will give the key to treatment. In order to do this for drowsiness, my course will be to compare the several conditions under which it occurs, and so to ascertain, if possible, what factor is common to them all.

We at once meet with a whole group of instances in all of which the supply of blood to the higher cerebral centres is diminished in quantity. The simplest case of the kind is furnished by ligature of the carotids, or by pressure upon them from some neighbouring tumour. The use of that large cupping instrument known as Junod's boot seems (according to Hammond) to be now common in the United States; and, when improperly employed, to produce drowsiness as well as other serious symptoms; no doubt by diverting the blood which should supply the brain to the lower limbs. In the same way, drowsiness after a heavy meal is due to plethora of the abdominal organs, and consequent anæmia of the brain (aided by mechanical interference with the circulation); and the

[1] Read before the Brighton and Sussex Medico-Chirurgical Society, November 1, 1877.

sleepiness which overcomes us when we come into a warm room after exposure to the cold air may be ascribed to rapid dilatation of the cutaneous vessels.

Vasomotor action produces cerebral anæmia and consequent drowsiness in two different ways: either by direct spasm of the intra-cranial arterioles, or by dilatation of the vessels in the rest of the body. Spastic cerebral anæmia is by far the most important of these.

The drowsiness which occurs sometimes in hysterical patients, lasting perhaps for many days, and often alternating with sleeplessness, is of this kind; and the same condition in a greater degree is observed in many cases of insanity.

Probably the sleepiness which is so common in the later stages of most chronic cerebral diseases is due to spasm of the arterioles from irritation,—it can hardly be merely mechanical, as it is not continuous.

The second variety of vasomotor cerebral anæmia is a little more complicated. It appears to depend upon the fact that the influence of the cardiac depressor is limited to dilating the abdominal arterioles, so that the vessels of the head would be relatively emptied of blood. The drowsiness which follows a mental or bodily shock seems to be thus produced; again, the irresistible drowsiness which overcomes persons exposed to great cold is apparently of this kind, the cold either directly paralysing the abdominal vessels, or bringing the dilating action of the splanchnics into play. The phenomenon known as "hibernation" is probably merely an extreme case of the same kind; according to Pflüger[1] the cerebral arteries are unusually small in all hibernating animals.

Finally, we have the drowsiness produced by *ennui* and want of occupation, where I imagine the deficient supply of blood is due to cerebral inactivity, an organ in a state of repose requiring less blood than when employed in its usual functions.

From the therapeutic results of the bromides (of which I shall by and by speak), Iam inclined to suppose that the drowsiness of bromism may be accounted for in the same manner. Hammond ascribes it to cerebral anæmia, but it seems more

[1] *Archiv*, vol. x. p. 468. The explanation given above seems to me preferable to the more complicated one suggested by Pflüger.

natural to assume that the primary action of bromine is on the nerve-tissue itself, probably in the way of arresting molecular change; and that any vasomotor alteration which occurs is secondary.

This is not a mere subtlety, but a point of some importance at the present day. We are in no danger of overlooking vaso-motor action; but there is rather a fear of our attributing too much to it, and forgetting that it only carries us one step farther back. It merely changes the *venue* from one part of the nervous system to another—in the case of drowsiness, from the cerebral hemispheres to the centres which regulate their blood-supply—the ultimate affection being always one of the nerve-cells themselves. This, in the case of drugs such as opium, chloral, and the like, appears to be produced by direct action of the drug upon them; but in other instances in response to an afferent stimulus, either from the hemispheres themselves in *ennui*, or from other parts in the other cases I have related.

It will be seen from what I have said that deficiency of blood in the brain only produces drowsiness under certain conditions. These are that the interruption to the flow of blood should be—1, incomplete, otherwise not sleepiness but coma is produced; 2, gradual; 3, diffused over the cortical centres. It would seem that the circulation in these is more readily impeded whether by mechanical or vaso-motor action, than that in the inferior ganglia, which are more immediately necessary to life. Probably their blood-supply is derived from different sources; Duret has latterly[1] pointed out that the various primary arterial branches in the skull seem to be destined to supply parts which differ in function.

It will be objected that a large number of cases in which drowsiness occurs are not examples of anæmia, but of congestion. But when we come to examine them we find that the congestion is not active, with dilated arterioles and increased rapidity of the blood-current; that seems to be followed by restlessness and want of sleep. Drowsiness occurs rather where there is passive congestion with obstruction to the venous circulation, and this is accompanied by arterial anæmia, so that the exception is merely apparent. The only simple examples of

[1] *Soc. de Biologie*, Jan. 1877.

drowsiness from stasis are those of pressure upon the veins; all others being complicated by the operation of another cause of which I am next to speak.

The supply of blood to the encephalon may be normal in *quantity* and yet drowsiness occur from some alteration in its *quality*. This branch of my subject is more obscure, yet some things about it are plain: thus it is certain that sleepiness is produced by the retention in the blood of certain products of tissue-change. It moreover seems probable that the active agent is carbonic acid, or some other result of deficient oxidation, rather than urea or other nitrogen compounds. The profound sleep produced by poisoning with carbonic acid or carbonic oxide points in this direction, and the conclusion is confirmed by clinical experience. We find drowsiness connected less frequently with renal than with cardiac and pulmonary diseases, and most of all with those in which oxidation is evidently diminished. When it does occur in combination with albuminuria, it will, I think, usually be found that this is due to venous stasis, and that there is passive congestion of the brain and imperfectly aërated blood.

Some doubt has been thrown upon the alleged hypnotic action of lactic acid; but, if it has any effect, this is probably due to its partial oxidation and to the accumulation of carbonic acid in the blood. Such is, at any rate, the most natural explanation of the varying results obtained from its administration by different experimenters.

The drowsiness of enteric and other fevers would probably be generally ascribed to a direct influence of the fever poison; but this is of course only a way of re-stating the fact, and adds nothing to our knowledge. In the absence of more positive information, it seems reasonable to suppose that here we have also to deal with the results of increased tissue-change and the retention of its products in the blood, assisted by the feeble propulsive power of the heart.

It will be found that the two series of causes I have now enumerated have one condition in common. Whether the blood sent to the brain be diminished in quantity, or contain an excess of carbonic acid, the supply of new material and the removal of that already used would be alike impeded.

This is most obviously seen in the healthy drowsiness which follows exertion; the products of nerve-waste having then accumulated in the encephalon more rapidly than they can be removed, unless fatigue has gone so far as to paralyse the vasomotor centres, when active congestion and wakefulness result.

I have not left myself much time to dwell upon the practical recognition of the various forms of drowsiness, which is generally easy. Thus, in old people, it usually coexists with deficient propulsive cardiac power and stagnation in the central and pulmonary vessels. In young persons it more often is due to spasm of the cerebral arterioles, which will be known by its connection with hysteria, insanity, or some other grave neurosis, by its intermittence, and by the position of the patient—whether the head be high or low—making no difference.

At the present day, when the bromides are prescribed to all sufferers from nervous disorders in so routine—I might almost say in so rash—a manner, drowsiness is perhaps as often produced by bromism as by any other cause. The possibility of this is never to be forgotten, as we may at any time meet with patients whose hearts are dilated and feeble, and yet who have been taking the bromide of potassium in large doses with the effect of aggravating all their symptoms.

The *treatment* will of course vary with the nature of each case. Where there is deficiency of cardiac power with stagnation in the lungs and brain, digitalis, free purges, and diuretics will be the only rational treatment. The bromides, and most of all the bromide of potassium, will here be injurious by diminishing still farther (as I have just said) the force of the heart and so increasing the cause of all the mischief. Yet I cannot agree with Hammond in thinking they should always be avoided in cases of drowsiness; as, when this is due to vaso-motor spasm they appear to me decidedly indicated, and I have certainly then found them do good. Hammond recommends the nitrite of amyl in such cases, but the inconvenience of its administration and its transitory action make me prefer the bromides. Dr. Handfield Jones advises belladonna for the drowsiness of old people, which he ascribes to cerebral anæmia. I have never yet seen drowsiness in an aged person where there was not

good reason for at least suspecting either organic cerebral disease or cardiac and pulmonary mischief. I have already suggested the line of treatment for the latter; but when drowsiness is connected with cerebral tumour, thrombosis, or the like, it seems to me very doubtful whether we should ever attempt to relieve it by medicine; probably it prolongs life by giving rest to the diseased organ, and it would certainly be rash to attempt acting by drugs upon the walls of unsound vessels. In the case of cerebral softening, arsenic has seemed to me sometimes to relieve for a time, and incidentally to diminish, the tendency to sleep.

Reviews.

Illustrations of Clinical Surgery. By Jonathan Hutchinson, F.R.C.S. London: J. and N. Churchill.

We have received Fasciculi IX. and X. of this publication, containing illustrations of injuries of the skull, of certain intracranial complications of these; representations of the eye in vasomotor paralysis, and plates depicting conditions observed in phlebitis and pyæmia. The writer announces that Fasciculus X. completes his first volume, and he has appended a copious index. Mr. Hutchinson is spending a large amount of time and careful labour on this work, and we congratulate him on the success he has attained. His illustrations stand alone in recent English surgical literature: they are life-sized, and admirably executed —in short, speaking likenesses. The letterpress, conveying in a concise form the writer's views on points in general pathology, or observations on his cases, forms an important part of the work. Surgery has become so vast a subject, presenting itself in so many aspects, involving so many collateral sciences and so many special methods, that it is beyond the power of any individual to master all its departments. He who attempts a systematic treatise on the whole range of surgery must, with all deference be it said, write a great deal that will not repay the trouble of reading it. Mr. Hutchinson has adopted a plan by which such an error is avoided. He writes on those subjects which he has particularly studied, or for the illustration of which he has especially appropriate materials. Thus what he writes is well worthy of attention. His remarks on the pupil in vasomotor paralysis, however, seem to challenge a few remarks. He says that the common belief that the pupil is contracted in paralysis of the cervical sympathetic is erroneous. The pupil is not contracted, but has lost the power to dilate. And in discussing the subject he alludes to Dr. William Ogle's paper in the 52nd vol. Med. Chir. Trans., 1869, and to Dr. Payne's in the St. Thomas's Hospital Reports, 1872, in order to point out that he had himself written a paper on the question

in 1866, and thus was first in the field; but he seems to have overlooked Dr. John Ogle's extremely able and exhaustive paper in the Med. Chir. Trans., vol. 41 (1855), Dr. Gairdner's essay in his Clinical Medicine, in 1862, and various communications by physiologists referred to by Dr. Ogle. At least, he makes no allusion to any of these sources of information. He states that his belief that the pupil is not contracted, but has only lost its power to dilate, is founded on many cases that have come under his own observation. Yet we cannot but think he is wrong. Both Dr. Ogle and Dr. Gairdner state that the pupil is really contracted, and we do not doubt that we have seen it so. In the two cases Mr. Hutchinson relates, there seems to be no proof that the sympathetic was completely divided. Indeed, the absence of symptoms that were marked in other recorded cases suggests that its division was only partial; and if this were so, the absence of contractions, seeing that the sphincter muscle was still opposed by some remaining action in the radiating fibres, would be badly explained. It will, nevertheless, be useful to follow his rule of examining the pupil in the shade, so as to see whether it becomes, like the other, dilated, or whether it remains fixed; by this means, injury of the sympathetic that would otherwise escape detection will be observed. The other symptom of vasomotor paralysis to which Mr. Hutchinson alludes as afforded by the eye—slight recession of the globe into the orbit and slight closure of the lid, so that the eye looks somewhat smaller than the other—is mentioned in Dr. J. Ogle's paper as having been observed in 1712 and 1727 by Pourfour du Petit.

In his remarks on pyæmia, Mr. Hutchinson strongly advocates the embolic theory that it is due to "the circulation of fragments of fibrinous matter, cohering masses of cells, and the like, derived from an inflamed vein, or lymphatic, but usually from a vein;" and he suggests that in order to be more precise in our creed we should adopt the term "phlebitis pyæmia," though possibly there are a few rare instances of "arteritis-pyæmia, and perhaps inflammation of lymphatic channels may sometimes contaminate the blood, so as to produce infective embolism." He differs "entirely as to fact from the assertions that proof of phlebitis is but rarely found," and thinks the evidence is overwhelming that phlebitis is the cause of the rest of the symptoms. However, seeing that phlebitis most undoubtedly very frequently exists without producing pyæmia; that fragments of blood-clot are frequently scattered through the blood without producing pyæmia; that there is a very able school of pathologists who believe that in pyæmia phlebitis is very often absent, and that when present it, like pyæmia, depends on some poison circulating in the blood; and, pending the discussion on septicæmia and

other allied processes that is now being carried on, the result of which may be very materially to change our views in this department of pathology, it seems unwise to introduce new terms and phrases. Mr. Hutchinson appends some interesting remarks on the question whether, and in what manner, pyæmia is contagious; and expresses his belief that when it spreads it does so not through the medium of the air entering the respiratory passages, but by inoculation from wound to wound. Hence his opinion that it may be prevented by well-known precautions against such wound-contagions.

Clinic of the Month.

The Treatment of Puerperal Pyrexia.—Dr. James G. Glover includes under the term puerperal pyrexia all cases of high temperature not associated with obvious external inflammation as in the breast, or with obvious infection from the common infectious diseases. Presumably the local lension is uterine, or periuterine, for there is almost always more or less pain in and tenderness over some part of the uterus with a good deal of abdominal distension. There is also generally a quick pulse, and the thermometer, which is an invaluable guide in such cases, shows a high temperature. In no case has Dr. Glover seen suppuration, and the patient has got well gradually. He thus sums up the treatment he has found most appropriate: "First, a dose of quinine and iron every three or four hours. The following is a good form in which to give these: quinine, two grains, tincture of iron, ten minims; spirits of chloroform, ten minims; syrup, half a drachm; distilled water, an ounce. Secondly, a dose of opium every three, four, six, or eight hours, according to the pain, without ipecacuanha, which may set up sickness, and without calomel, which may set up unnecessary irritation of the bowels. It is astonishing how women with uterine pain take to opium, or would be so if the fact were not so familiar in practice. The dose of opium, say half a grain, is best given in a small pill. Thirdly, a large linseed or bran poultice over the stomach, repeated every three or four hours. A little laudanum in it often adds much to its soothing effect. Fourthly, and very particularly, vaginal injections, at least twice a day, of warm water with a little Condy's fluid in it. The diet should consist chiefly of good beef-tea or chicken-broth, with generally a small regulated allowance of brandy, a dessert-spoonful every three or four hours. Sometimes the brandy is best given with arrowroot." A correspondent, Mr. Whittle of Brighton, commenting on this note by Dr. Glover, in the following number of the *Lancet* refers the recovery of the patient in these cases not so much to special

internal treatment as to rest and local measures, but thinks on local lesion is present.—(*Lancet*, Feb. 2, 1878.)

Therapeutic value of Eucalyptus Globulus.—Mr. Benj. Bell states that his attention was drawn to this remedy by an interesting reference to it in Sir John Rose Cormack's *Clinical Studies*, in which he stated that he used with advantage an injection of an infusion of the leaves of the eucalyptus, or a mixture of from one to four drachms of a tincture in eight ounces of tepid water. Besides being refreshing and comforting to patients so affected, these applications have in his experience a remarkable power of destroying the fœtid odour of morbid discharges without the substitution of another unpleasant smell. He extends the remark after much experience to the offensive discharges attendant upon cases of ozoena, cancer of the tongue and throat, cancer of the uterus, gangrene and other affections accompanied by fœtors. He further mentions that in simple uterine catarrh he knows of no remedy equal in value to the eucalyptus globulus, the most satisfactory results proceeding from its simultaneous administration by the stomach and in the form of injection. These statements, with the circumstance that a preparation of the essential oil in capsules is a favourite prescription with many leading physicians in Paris, led Mr. Bell to make extensive trial of the remedy, using always the tincture in doses not exceeding a teaspoonful, mixed with a wineglassful of water, twice a day. He has found remarkable benefit accrue in several cases of bronchitis with profuse expectoration. It then occurred to him that a plant which has obtained so great a reputation in Tasmania and elsewhere as a defence against malaria, and which evidently possesses valuable properties as a disinfectant, deodorant, and astringent, might prove useful in certain forms of disease in the stomach and bowels. The cases in which he has especially tried it are those in which there have been symptoms of malignant ulceration, such as vomiting, hæmorrhage, &c., and the results have fully justified his expectations. It has further seemed to him of manifest use lately in a case of diphtheria commencing in the gullet and ascending to the fauces, and he thinks it might be prescribed with advantage in cases of typhoid fever.—(*Edin. Med. Journal*, Feb. 1878.)

The Treatment of Professional Dyscinesiæ.—Dr. Leonardo Bianchi states that he some years ago published a case of scrivener's cramp, which in a very short space of time was cured with hypodermic injections of nitrate of strychnia. The young man whose case was reported, at that time a student, is now a barrister, and has never since been troubled with the malady. He now relates a series of cases of writers,' telegraphists', and musicians' cramp, in which he applied the same treatment,

(with or without electricity), with success. He employs a solution of nitrate of strychnia, of such strength that every *gramme* of the solution representing the capacity of Luer's syringe contains five *milligrammes* of the nitrate of strychnia. He began by using one milligramme and a half (·023 grain), and increased the dose to three milligrammes and a half (·054 grain) every other day. The injections were practised on the forearm; none of them were followed by inflammatory reaction, and after the tenth, *i.e.* the twentieth day of treatment, the patient was usually cured. The results of his observations have satisfied him that the condition of the morbid process in the professional dyscinesiæ as well as its seat differ in different cases; that the difference in the disturbing process of the disease in its seat and in the mechanism by which the malady is determined is perfectly in harmony with the difference of the clinical forms; that the prognosis may be considered less grave than most pathologists believe, and lastly, that the treatment, electric or internal, in order that it may obtain a greater average of recoveries, must be conformable to the clinical character of the disease, which differs in various cases, and which must indicate when the ascending or descending current may have a better effect on the spinal cord and on the nerves, when simultaneous faradisation of the muscles and of the skin (disturbance of tactile sense) may be applied with success; when galvanisation of the brain or of the sympathetic nerves in the neck is useful, and when the hypodermic injections of strychnia, exclusively or associated with an established method of electrisation, may be of some utility.—(*British Med. Journal*, Jan. 19, 1878.)

New Method of Drainage after Removal of the Breast.—A case is recorded as having been under the care of Mr. Bell, in the Royal Infirmary, Edinburgh, of a woman, aged sixty, suffering from scirrhus of the mamma with epithelioma of the nipple, in which he tried a new plan of drainage on a principle suggested by Mr. McGill of Leeds. A piece of drainage-tubing about three feet long was used. One end was pierced with holes and laid along the wound, and secured at the upper end by a stitch. The other end was weighted and placed in a six-ounce bottle half full of carbolic lotion (1 to 40). To prevent air from passing in by the side of the tube, it was carefully packed round by pieces of loose gauze. During the next twenty-four hours about five ounces of serum were drained away, and when the dressing was removed, only about a fourth of the usual discharge was found on it. The only extra precaution required during dressing was that the tube should be secured by a piece of bandage or a clip, lest any air should pass up it while it was out of the bottle. On the second day after the operation scarcely any discharge was found on the dressing.

After this the wound was dressed only every second day until January 4, when it was found to be almost healed, and was dressed with a strip of boracic lint. The patient was dismissed on January 7, the twelfth day after operation, the wound being quite healed. The temperature and pulse average normal.

The advantages claimed for this mode of drainage are: (1) that it prevents tension; (2) that it lessens the amount of discharge on the dressing, thus allowing of fewer dressings; (3) that under favourable circumstances it would do away with dressing the wound, as the bottle need only be emptied and refilled; (4) that it would be a speedy indication of bleeding. The disadvantages are: (1) the difficulty of arranging the dressings so that no air could pass up by the tube; (2) the risk of the tube becoming choked by clots. (*Lancet*, January 26, 1878.)

The Use of the Calomel Vapour Bath.—Dr. Yandell of Louisville recently gave in the *American Practitioner* an account of his success in using mercurial fumigations in syphilis, and stated in his paper that the recoveries were not so rapid as in Mr. Henry Lee's cases. The explanation of this is given by Mr. Lee, who says that the great majority of those first treated were hospital patients. These, often several in succession, were placed in a box in which the ten or fifteen grains of calomel were volatilised. The room in which the box was contained was small, and looking back upon the rapid and almost uniform results obtained, Mr. Lee has no doubt that the patients got the benefit of some of the calomel that was left in the box, and perhaps in the room, in addition to the ten or fifteen grains that were devoted to their individual use. In private practice he generally advises patients to use the same cloak, made of cotton and termed moleskin, night after night, and to sleep in it; and thus the calomel vaporised one night was again to some extent utilised the next. Dr. Yandell's results appear to have been very good, but he recommends friction in addition. (*Lancet*, Feb. 9, 1878.)

Quinine a physiological Antidote to the Malarial Poison.—Dr. F. W. Monsel remarks that the most important and ancient of the uses of quinine depends undoubtedly on its power both as a curative and as a prophylactic agent in malarial diseases, and he proceeds to refer to the different theories that have been advanced in regard to its mode of action. It must, he maintains, be either a chemical or a physiological antidote; in the one case the poison itself being attacked by the remedy, in the other the system, or that part of it which is the seat of election, by the poison being braced up so as to resist its power in whole or in part. He thinks the recurrence of attacks of

ague after a paroxysm has been arrested by its administration to be opposed to Binz's view of its action as a paralysing agent on the malarial poison, and he is inclined himself to admit that it exerts an influence on that part of the nervous system for which the malarial poison has a special affinity, and in virtue of this is more curative than other remedies, as arsenic, caffein, bebeeria, piperine, gentian, capsicum, and strychnia, just as arsenic has a special tonic influence on the motor nerves in virtue of which it is more powerful in chorea, and caffein an action on the pulmonary veins which renders it more useful in asthma. Hence he believes quinine to act in malarial disease as a stimulant or sedative to the nervous system, especially to that part most implicated in these diseases, and that it is principally in virtue of this action that it proves curative, by rendering the malarial poison inoperative by an antagonistic action on the nervous system, and that it proves beneficial in proportion as the nervous disturbance is predominant, and as there is an absence of complications. (*Edin. Med. Journal*, Feb. 1878.)

Iodoform as a local Application.—Mr. Wyndham Cottle states that he has generally employed the solution in warm oil of this drug, though chloroform is its most effective solvent. It can readily be made into an ointment with vasaline, and its odour concealed by an admixture of some aromatic oil. As a powder it can be employed alone, or diluted with fuller's earth, magnesia, or tannin. He finds that it is extremely serviceable in venereal sores, whether hard or soft, and whether beneath the prepuce or on other parts. Its action seems to be that of a topical irritant, and it should not therefore be applied to a sore when acutely inflamed. He states that he treated twenty cases of primary venereal sores, as they occurred in practice, without any attempt at selection, by the ordinary methods, and a similar number with the aid of iodoform, and the time occupied in the cure was just twice as long by the former as compared with the latter mode. It seemed to him further, that the risk of buboes was diminished, and that there was less constitutional depression. The sequence of secondary syphilis was less, and the remedy acted particularly well in cases where there was a disposition to slough. In the treatment of buboes again, of a tedious and indolent kind, great advantage resulted from its use. These, when opened, often present deep and extensive sinuses and fissures, which show little or no inclination to heal. Such cases almost invariably rapidly granulate, contract, and cicatrise by the application of iodoform, and the same obtains of the later stages and forms of syphilitic ulceration. He has often injected deep sinuses with a solution of iodoform, and found them mend under this treatment when

other means failed. He has further formed a high opinion of the value of iodoform as a therapeutic agent in chronic ulcers of the lower extremities; ulcers that have remained open for years under a great variety of treatment often closing in a few weeks under its influence. Here again, it must not be applied to an inflamed or irritable ulcer, but to the indolent ulcer, glazed and œdematous surfaces quickly assuming a healthy aspect. He has lastly used it as a parasiticide in ringworm of the scalp with advantage. Chloasma quickly yields to this agent, but it proved too irritating in cases of sycosis.

Dr. Prosser James states that he has long used iodoform in ulcerations of the throat, whether syphilitic or not. He applies it either dissolved in ether or directly in the form of powder. It is most efficacious in specific ulceration of the soft palate, pharynx, tonsils, or nasal passages. It is a means of curing obstinate cases of ozœna. He gives it internally in one-grain doses with extract of taraxacum.

Dr. Woakes finds that iodoform exercises quite a specific influence in cases of rhinitis, ozœna, postnasal catarrh, and hyperplastic deposits, whether simple or syphilitic. He uses "iodoform wool," prepared for him by Messrs. Bullock and Co., each drachm of the wool containing one drachm of iodoform. A small portion is introduced on the point of a probe, and applied to the desired part of the nasal cavity. It possesses a certain pain-allaying character.

Mr. Lennox Browne also finds iodoform very serviceable in subacute and catarrhal inflammation of the naso-pharyngeal mucous membrane. He applies either an ethereal solution, or an ointment made with vasaline. (*Brit. Med. Journ.* Feb. 9, 1878.)

Removal of foreign bodies from the Auditory Canal.—Dr. George Gray, of Castlewellan, Co. Down, suggests a simple and harmless plan which he has lately used with success in removing foreign bodies from the auditory canal. Some months ago a boy, age twelve, was brought to him with a round, smooth, white pebble in the auditary canal. It could be plainly seen, and had been there for two days, during which time repeated efforts had been made to remove it, but their only result was to cause pain, congestion, and swelling of the mucous membrane, which firmly grasped the foreign body, and prevented the possibility of passing any instrument beyond it. Dr. Gray syringed the ear for some time without any good result, and, as the boy's friends were anxious to have other means tried, he did not like to send him home unrelieved. Having at hand a bottle of the cement known as coaguline, which seems to be a solution of isinglass in acetic acid, he prepared a piece of soft pine-wood, about as thick as a No. 8 catheter, by hollowing the end so as to

cause it to fit accurately on the convexity of the pebble. Having now melted the cement by placing the bottle in hot water, and having dried the foreign body with cotton-wool, he covered the hollow end of the piece of wood with the cement, and applied it to the pepple. After waiting for ten or twelve minutes for the cement to set, he made gentle but steady traction, and had the satisfaction of withdrawing the stone firmly cemented on to the end of the wood. This plan will obviously be more suitable for round smooth bodies which fill the canal than for small angular ones, but the former are the ones most difficult to remove by any other precedure. (*Brit. Med. Journ.* Feb. 9, 1878.)

Treatment of Carbuncle.—Mr. Montgomery A. Ward, of Dublin, in a report on Practical Surgery, observes that there is great difference of opinion amongst surgeons in regard to the best mode of treatment of carbuncle, though this is of high importance, especially when it is seated on the back of the head. The several plans in use at the present time are: 1. The method of compression ably advocated by the late Mr. O'Ferrall, and more recently by Mr. M. H. Collis. This Mr. Ward has frequently used with marked success in carbuncles of small size, but he believes it to be impracticable for large carbuncles situated on the back of the head. 2. The crucial incision which it still a favourite remedy with many surgeons. In many cases it answers admirably, but it would be hazardous to adopt where, if made from sound skin to sound skin, it would extend from one parotid region to another. The two chief dangers are hæmorrhage and the formation of a large suppurating sore. 3. The method of treatment by caustics. This Mr. Ward states he has never used; but in one case he had seen in which it had been adopted, the integument was extensively destroyed, leaving a large cicatrix, a result which he considers it is extremely important to avoid. 4. With regard to the plan of treatment by poulticing he has likewise had no experience, though he is aware it has succeeded well in the hands of a colleague, Mr. Richardson. 5. M. Gosselin recommends the plan of making punctures and then applying compression. 6. The plan he proposes himself, and of the good effects of which he reports a case, is that he makes one incision about an inch and a half or two inches long, as the case may be, over the centre of the carbuncle, when the slough has formed, and from four to six counter openings round the central one, varying in size from a quarter to half an inch. He then plugs the openings with strips of lint steeped in some stimulating application, and lays a poultice over all, dressing the carbuncle in the same way every day until all the sloughs have separated. The advantages Mr. Ward claims for this method are: First and most important, all

the integument is preserved. 2. It has all the advantages of the mode of treatment by crucial incision, without any of the disadvantages. 3. There is almost entire freedom from hæmorrhage. 4. The occurrence of a large suppurating sore is avoided. 5. Sufficient space is afforded for the escape and removal of dead cellular tissue. 6. Very slight cicatricial marking results. (*Dublin Journal of Med. Science.* No. LXIX 1877.)

Extracts from British and Foreign Journals.

Arsenic in the Treatment of Malignant Lymphoma.—In 1871, Professor Billroth published the history of a well marked case of multiple lymphoma, which was cured in a short space of time by the internal use of Fowler's solution. Since then he has repeatedly employed the same treatment with the most marked success. Extensive tumours in all parts of the body complicated by masses of hyperplastic glands as large as a man's head, in the thorax and abdomen, have under the use of arsenic disappeared entirely, or at least diminished so much in size that the patient was able to return to work. In some cases the treatment had to be continued a year. Professor Billroth does not deny the value of operative measures in the early stages of the affection, when only a few superficial glands are affected, but even in such cases advises the use of arsenic also, in order to prevent the spread of the disease to other glands. In the later stages of the affection, when the deeply seated glands are involved, an operation is out of the question, and experience has proved that the arsenic treatment is the only one which offers a prospect of saving the life of the patient. Relapses frequently occur, but are speedily arrested by the same treatment. The arsenic should be given internally and by parenchymatous injection into the glands at the same time. Five drops of Fowler's solution, with an equal quantity of tincture of iron or of dialysed iron, are to be given morning and evening on a full stomach. Every second or third day the dose is to be increased by one drop, until symptoms of poisoning make their appearance ;—this usually does not occur until the patient is taking from twenty-five to thirty drops of Fowler's solution *pro die*. The dose should then be diminished by a drop every second day, but on no account should the arsenic be stopped immediately. Sometimes the symptoms of poisoning do not set in at all, even when forty drops of the solution are given *pro die*. In Professor Billroth's wards, the dose is never allowed to exceed this point. For the parenchymatous injections, pure Fowler's solution is to be used, and as a rule only a few drops should be injected in one spot. Two or three injections may be made every day, provided there

be no local irritation. When the glands become inflamed the injections must be discontinued, and moist heat employed. In making the injections, care must be taken to prevent the escape of any of the solution into the subcutaneous areolar tissue, an accident which is betrayed by sudden and intense pain. The injections are sometimes followed by neuralgic pains, which are readily relieved by hot compresses to the painful glands. Children are much more tolerant of arsenic than adults. The treatment sometimes causes sleeplessness, restlessness, an excited state of the nervous system, a melancholic condition, &c., all of which disappear as soon as the dose is diminished. Fever is very generally, but not always present; it may be remittent or intermittent. The latter, in Professor Billroth's wards, was observed only in patients who were treated by parenchymatous injections, and always set in about an hour after the injection. During every attack of fever, the glandular tumours became noticeably smaller. The fever never occurs in cases in which no diminution in the size of the tumours takes place; in other words, the arsenic fever is simply a resorption fever. Where the arsenious acid has been injected into a gland, a small spot of necrosis is produced. The glands, however, do not show traces of suppuration or of caseous degeneration, hence it is probable that the arsenic in the circulation acts chemically on the lymphoid cells, which undergo such changes as to become capable of being re-absorbed. The destructive influence of the arsenic on the physiological tissues should be counteracted by good food and by alcohol; if the fever becomes too violent, the doses should be diminished.

The following are the most important conclusions drawn by Dr. Winiwarter, the author of the paper from which the above is taken:—

I. The arsenic treatment is efficacious in cases of malignant lymphoma, and also of leukæmia, since it leads to the resorption of the hyperplastic glandular tissue.

II. The good effects of the arsenic are due to its power of inducing in the albuminous tissues, and above all others in the glandular tumours, a destructive process which prepares them for resorption.

III. The local action of parenchymatous injections and the arsenic fever assist in producing the diminution in the size of the tumours. (*New York Medical Record*, August 25, 1877.)

Easy Mode of determining the Existence of a Perforation of the Lung in Pneumothorax.—Dr. Ewald demonstrated before the Berlin Medical Society an easy method of determining the presence of a perforation of the lung in cases of pneumothorax, which consisted in ascertaining the relative

amount of oxygen and carbonic acid gas in the air contained in the abnormal cavity. If the quantity of carbonic acid gas does not exceed 10 per cent. a perforation is surely present, but if it exceed that amount the cavity is closed. This knowledge is not unimportant in regard to treatment. If the communication be open, puncture is only permissible to save life, or to diminish pressure on neighbouring organs, whilst if it is closed, the air may be allowed to escape by a puncture in the hope that the lung will again expand. Having established this, it next suggested itself to Ewald to arrange a plan by which the amount of carbonic acid could be determined readily. To this end he passes in a tubular needle and sucks out an injection-syringe full of the air contained in the cavity. This is introduced into a burette filled with a solution of salt and inverted over a similar solution contained in a saucer; after the gas has risen its volume is taken. A small piece of caustic potash is then introduced into the burette, the mouth of which is closed with the finger and reversed. The piece of potash adheres to the bottom of the vessel when the burette is again inverted. This rapidly absorbs the carbonic acid, and the difference between the first and second readings gives of course the amount of carbonic acid gas absorbed, and the percentage amount can be easily calculated. (*Med. chir. Rundschau, Heft* 3, 1877).

Mammary Abscess treated Antiseptically.—Dr. James Carmichael, in a paper read before the Edinburgh Obstetrical Society, observed that the after-treatment of milk abscess as hitherto practised is in many cases unsatisfactory. The method adopted has been generally that used in abscesses in other parts of the body—poultices, water-dressing, lotions, and ointments of various kinds. The inconvenience, nay the disadvantage of these applications, is perhaps more apparent here than elsewhere. The delicate skin of the breast and nipple does not bear well, soaking, or the application of almost any of the ordinary dressings, and often shows its dislike, so to speak, to such applications by breaking out into eczematous, pustular, or other kinds of eruptions, which trouble and annoy the patient, perhaps long after the wound has healed. In some cases, wet dressings tend to encourage suppuration in the sac, and, by leading to a long continuance of discharge, prevent the speedy healing of the wound, and favour the production of sinuses. Dr. Carmichael then proceeded to give a case in which on the third day the breasts became gorged, and on the fifteenth day an abscess was clearly formed; on the seventeenth day it was laid freely open, twelve ounces of matter escaped; poultices were applied for twenty-four hours, and

subsequently water-dressing. A considerable quantity of matter continued to be discharged for some time, and three weeks elapsed before the wound healed. Four days after the abscess in this the right breast was opened, the patient began to complain of the left breast, and on examination it was found to be tumid, and swollen, but painless. Belladonna ointment was applied with gentle friction. Diluted tincture of iodine was likewise used, but without effect. At the end of ten days, the breast had become enlarged and prominent, and fluctuation was distinct over its entire extent, giving the impression that the whole mamma was converted into one large abscess. The patient was now very weak, and it became a matter of moment to save her, if possible, a repetition of the same debilitating process a second time ; it was therefore determined to operate on this occasion antiseptically. Having placed a rag soaked with carbolic acid over the breast, he quickly raised its edge, and made an incision about an inch long; quickly replacing the rag with both hands he then gently squeezed out the entire contents of the abscess, about a breakfast-cupful of matter. A drainage-tube was now inserted into the cavity, and through this a weak carbolic solution was injected, so as to wash out completely the interior of the breast. The wound was dressed by applying first a piece of lint soaked in carbolic-oil, and then several layers of dry lint of a larger size on the top, and over all a thick layer of chloralum wool. The following day the dressings were removed. They were thoroughly soaked with serous oozing, but no more pus had been discharged. The drainage-tube was removed and the wound dressed as before. On the fifth day the dressings were again removed and the wound was healed. The wound in the opposite breast was still open and discharging, and was not closed for fully a week after this breast had been firmly healed. The comparative result of treatment speaks for itself. (*Edinburgh Medical Journal*, October, 1877.)

Treatment of Œsophagism by Injections of Morphia.—Dr. Reichard records a case in which he was called to a patient suffering from suffocation and very painful spasms of the œsophagus. When these occurred the patient was in a state of great agitation ; respiration was easy, but he suffered from severe thirst. Yet immediately on attempting to swallow, the most severe contractions of the pharynx and œsophagus were produced. The liquids introduced were violently ejected, and he found it impossible even to swallow his saliva. This state had come on suddenly, without evident cause, as he was about to sit down to his dinner. No information was obtained from an examination of the throat nor from the history. In the first instance it was

feared it was an attack of hydrophobia, and subsequently that it might be due to some foreign body situated in the œsophagus, or that it might be due to some toxic or irritant agent which he had swallowed, but no evidence could be obtained on these points. A free local bleeding was prescribed and several hypodermic injections of morphia, which, upon the whole, represented a grain and a half of hydrochlorate of morphia. These measures effected a rapid cure, and on the following morning the patient, though much fatigued, could swallow well. In commenting on this cure M. Schützenberger stated that he had seen many cases, but they had all resulted from some general nervous condition or from poison. M. Sieffermann related two cases in which similar violent and painful contractions were present, and were caused by foreign bodies becoming impacted in the œsophagus. (*Gazette Médicale de Strasbourg*, No. 5.)

Glycerite of Kephaline.—Dr. E. Wiley, of Philadelphia, contributes the results of some observations on this remedy. Dr. Polk applies the name kephaline to the brain hypophosphites in their normal union with albumen and glycerine. This combination consists of the brain hypophosphorous acid and the brain hypophosphites of calcium, magnesium, sodium, and ammonium formed into solution and preserved in chemically pure glycerine. The therapeutic properties of glycerite of kephaline are nutrient and tonic. In loss of memory following intense mental action whether from the emotions, or intellect, or from sexual abuse, it very promptly restores the normal brain power. Glycerophosphorous acid associated with the alkaline hypophosphites constitute a large proportion of the seminal fluid. Whatever entails a heavy loss of these constitutes a severe drain of these hypophosphites, and the administration of the glycerite of kephaline supplies the loss. Dr. Wiley has found the glycerite very useful in the early stages of consumption. (*Virginia Medical Monthly*, June, 1877.)

Ingluvin.—Ingluvin is obtained from the gizzard of the domestic fowl (chicken), and is almost a specific for the vomiting of pregnancy. Dr. Shelley has used the remedy for twenty-five years. It is also the most powerful and reliable remedy for dyspepsia and sick stomach, due to debility of the organ. It is useful in all cases where pepsin and pancreatin are indicated. In complicated gastric affections, such as inflammation, gastralgia, pyrosis, etc., it may be combined with subnitrate of bismuth and opiates; and in diarrhœa and cholera infantum with vegetable or mineral astringents. The dose for an adult is from five to ten grains. (*Med. and Surg. Reporter*, June, 1877.)

New Method of treating Trichiasis.—Dr. Galezowski recommends the following plan of treating inversion of the

eyelashes as having proved very successful in his hands, and as one that is sufficiently easy to practise. The patient being anæstheticised, a horn spatula is introduced beneath the lid to protect the cornea; an incision is then made through the skin parallel to the border of the lid from one angle to the other; the skin is immediately dissected back from both sides of the wound. The two edges of the wound are now strongly separated by retractors or forceps, and all the subcutaneous tissues—the muscular layer, the cellular tissue, and finally the surface of the tarsus—are cauterised with a thermo-cautery having a very fine extremity. At the conclusion of the operation the wound is carefully cleansed, and iced compresses are applied to the eyelid. On the third day the lid and even the cheek become inflamed, suppuration occurs, and lasts for a week. And now by degrees the borders of the wound become approximated and the cicatricial tissue, which is formed, brings about the complete restoration of the cilia to their natural position so far as regards the cutaneous wound; this not having been cauterised but only incised, its edges become closely adherent and constitute a linear cicatrix that is hardly visible. In fact, by taking the precaution to incise the skin before applying the cautery, the formation of a large red cicatrix which often remains for a long time, is avoided. (*Recueil d'Ophthalmologie*, Juillet, 1877.)

Sulphurous Acid Treatment of Cholera.—In a letter to the editor of the *Indian Medical Gazette*, dated May 1, 1877, Surgeon-Major Charles R. G. Parker forwards the notes of ten cases treated successfully with sulphurous acid. There seems to be no doubt about the nature of the cases, and the plan seems worthy of further trial. The apparatus required is very simple, consisting only of an ordinary movable charcoal brazier, an earthen platter, and some sulphur. He lays great stress on the sulphur being burnt *in* a vessel and not thrown on the fire, as it in the former way burns more purely and steadily and the patient gets most advantage from it, and the vessel should be *earthen*, because when burnt in metal pans, especially in iron ones, it is apt not to burn freely, but form a layer in the vessel, first viscid and then dry and brittle. As soon as the patient is attacked, or as soon as possible, the charcoal fire should be fanned to a bright heat, placing on it the flat plate; when this is *well* heated so that a little sulphur dropped upon it ignites spontaneously, the whole apparatus should be moved close to the patient's bed, and placed about a yard or so from his head. There should be no draught through the room, but moderate access of fresh air. A good handful of powdered sulphur should then be placed on the plate, and the fire well fanned that the sulphur may quickly melt and burn freely. It should be kept

burning in this way and in about the same quantity continuously till the patient passes urine *freely*, and then at intervals of an hour or two hours, for at least twenty-four hours after urine has passed. As the patient becomes able to take it, support in the form of wine, beef-tea, and brandy should be carefully given. The quantity of sulphur burnt in twelve hours should not be less than from five to seven pounds for one patient. Of course the remedy should not be pushed so far as to run a risk of asphyxiating the patient. (*Indian Medical Gazette*, May 1, 1877.)

Subcutaneous Injection of Cold Water in Acute Articular Rheumatism.—Dr. Liron has treated successfully three cases of acute articular rheumatism, by the subcutaneous injection of about twenty drops of cold water in the vicinity of the affected joint. The plan was originally suggested by Potain in 1869, and was more recently recommended by Dieulafoy. (*Gaz. des Hôpitaux*, No. 92, 1877.)

Hypodermic Injection of Colchicin in Rheumatism.—Prof. Heyfelder strongly recommends, as having proved successful in his hands in the treatment of chronic articular rheumatism and in rheumatic neuralgia, the injection of colchicin in doses of one-third of a grain, or in those who have a delicate skin of one-sixth of a grain. (*Berlin klin. Wochenschrift*, No. 15, 1877.)

The Therapeutics of Headache.—Dr. Eugene Dupuy recently addressed the New York Medical Journal Association on the above subject; restricting his remarks to migraine, a headache which he thinks manifests itself in some persons and not in others, because the membranes of the brain in the neighbourhood of the pons are in some in a state of chronic preparation for its development. Although the headache is not continuous, the condition necessary to its development after the action of some exciting cause is there. The condition indicated is a moderate inflammatory state or a severe congestion of the meninges about the pons. The headache usually shows itself after various kinds of gastric disturbance, after improper use of alcohol, &c.; fatigue and over-work might also be exciting causes. Such headaches never appear spontaneously. It is believed to be possible to cut short the attack, or to destroy it altogether, by resorting to one of the following measures: the most successful means are those which act in a reflex manner. For instance, irritation of peripheral nerves, such as might be brought about by introducing alcoholic liquors, like brandy, or strong snuff into the nostril upon the side corresponding with that to which the pain is referred, will check the headache. In other words, irritation of the mucous membrane of the nose can be resorted to with benefit. The remedy to which Dr. Dupuy

directs special attention is carbonic acid gas, thrown against the nasal mucous membrane in a jet sufficiently strong to produce a marked impression. Such an exhibition of the gas seldom fails, he says, to remove the pain within two or three minutes after its application. A sharp occipital pain is produced in those cases in which the remedy is to afford relief, so that the failure to develop such pain is regarded as a warrant for the second introduction of the gas. In the headache symptomatic of fever, or the headache of hysterical persons, this remedy does not succeed. Another remedy efficacious in the treatment of an attack of migraine is the potion of Riverius, to which is added bromide of potassium. The potion consists of citric acid and simple syrup, and bicarbonate of potassa and water. It is an effervescing mixture, and is recommended to be administered in alternate tablespoonfuls, allowing the effervescence to take place in the stomach. The mode in which these means act in the cure of sick headache is the removal of irritation from the tract of the middle encephalon, where the roots of the fifth nerve have their origin. The cause is an alteration of nutrition, especially in the way of congestion, brought on by irritation of the meninges. The substances recommended produce their good effects by arresting the influence exerted by that morbid state. No rule can be given with reference to treatment during the interval between the attacks. It should be directed towards producing changes in the nervous centres already mentioned. The exhibition of arsenic to such an extent as to produce slight œdema of the lower eyelids, would sometimes remove the attack for a long time. It is thought also necessary to give belladonna at times, sufficient to produce its physiological effect. Occasional mustard plasters to the nape of the neck and the use of mild aloetic aperients are recommended. The cannabis indica has a strong curative effect upon the form of headache under consideration, and might with advantage be alternated with valerian or tannin. The rheumatic, gouty, and syphilitic diathesis must be studied, and appropriate remedies administered. (*Medical Record of New York*, No. 342.)

On the Therapeutic Action of Sulphate of Copper.— Drs. Levi and Barduzzi observe that the classical researches of Orfila, Christisson, and others, appear to have established the toxic properties of sulphate of copper, and the inflammation of the alimentary canal following the prolonged use of this salt; although it must be acknowledged that their observations have not been corroborated by some experimenters. Bourneville, for example, gives the example of an epileptic, who died after taking upwards of 1,000 grains of sulphate of copper in 151 days. In the autopsy it is expressly stated that the mucous membrane of the intestine did not present any alteration of structure. And

again, when this salt is administered in small doses, and for some time, it is stated to produce an augmentation of appetite, of physical vigour, and improvement in the general condition. The researches which they have been able to make, they state, have not been sufficiently numerous to clear up these obscure points, but have been only made with a view to draw some clinical conclusions. In their first experiment they gave to an utterly worn-out old horse 15 grains of sulphate of copper each day for 30 days, with the result, after the fourth day, of effecting an improvement in the general condition, the mucous membrane in particular acquiring a lively red colour. On the thirtieth day the animal was killed, and the necrostopic appearances were entirely negative. Traces of the metal were found in the blood, and more in a portion of the liver. Similar results were obtained from the administration of 30 grains of sulphate of copper to an ass. In a dog of medium size, to which one or two grains of sulphate of copper were administered for a week, no symptoms were observed except slight efforts of vomiting on the 13th and 15th February, but both his appetite and weight increased. The authors give various cases where sulphate of copper, given in small doses, varying from a quarter of a grain to a grain, was not only tolerated by the stomach and intestines, but gave a strong impulse to the nutritive processes, and they suggest that the term "récorporant" should be applied to it. They explain this power by considering it to be due to excitation of the peptic glands, which, aided by a more energetic contractility of the smooth muscular fibre of the alimentary canal, of its vessels and secretory ducts, that is to say, by its astringent action, renders the digestive process more vigorous, and assimilation more complete and perfect. (*Commentario Clinico di Pisa*, September, 1877.)

The Toxic Action of Copper.—M. Galippe has undertaken some new researches to determine the validity of the statements made by Pelikan, Burg, and Ducour, that dogs may be fed for considerable periods on food contaminated by copper without harm. He found that the sulphate, acetate, lactate, and citrate of copper, even when given in considerable doses, only caused vomiting, whilst small doses, gradually increased, were productive of no inconvenience. He next, with praiseworthy self-devotion, experimented on himself, and fed for a month at a time on food prepared in copper vessels and some articles after the addition of acetic acid. In the latter case they presented a green discoloration at the edges in contact with the vessel after the lapse of a few hours; the green tint being in part due to oil globules which had assumed that hue. The results of his experiments showed that food so contaminated with copper

produced absolutely no toxic or disagreeable effects whatever. After having established this, he obtained the consent of another person to go through the same ordeal, and the result was the same. (*Comptes Rendus*, T. LXXXIV. p. 718.)

The Action of Alcohol in Fever.—Testi Alberico gives as the result of his clinical investigation upon the action of alcohol:—1. That alcohol does not produce any depression of temperature when given in febrile states of the system, though high temperatures do not *per se* constitute any contraindication to its use. 2. Alcohol as long as it remains unaltered in the system is a powerful dynamic of the vasomotor nervous system. 3. As a consequence of the changes which alcohol undergoes in the system it indirectly becomes a very valuable aliment, whilst it augments the metamorphosis of tissue. (*Il Raccoglitore*, No. 10-11, 1877.)

The Effects of Varnishing the Skin in Man.—It is well known that the application of a coat of varnish to the skin of animals produces serious effects and even death. No experiments of this kind have been made directly on man, though from the comparatively harmless effects of the infriction of oily substances, ointments and oil baths given for therapeutic or cosmetic purposes, and from the slight phenomena attendant on extensive disease of the skin in psoriasis and ichthyosis, there is reason to believe that the suppression of its functions, brought about by such means, would be better borne by him. Senator had already applied varnish to the skin of patients in fever with a view of lowering their temperature as it is known to do in animals, and in his present experiments used castor oil collodion and the application of strips of adhesive plaster. He found that no fatal, nor even any injurious effects followed. No change in the temperature of the body was noted. (*Virchow's Archiv*, B. LXX. p. 182.)

Alcohol Dressings in Wounds of the Scalp.—Prof. Gosselin, in a recent clinical lecture, called attention to a patient with an extensive contused superficial wound of the scalp, unaccompanied by detachment or denudation. He did so because it was an example of the rapid healing of such wounds which has been so frequently observed under dressing with pure alcohol, without the development of any diffused or erysipetalous inflammation. The rapid cicatrisation that takes place is not the result of healing by the first intention, for the edges of the wound still remain a little apart, while the lips and bottom of the wound give issue to sanguinolent sero-purulent secretion in nowise resembling good pus. This secretion gradually ceases and the wound becomes dry without ever having been covered with

granulations. This instance is a good example of the cases which have for some time attracted Prof. Gosselin's attention, in which wounds are healed by this intermediate mechanism, which is neither immediate cicatrisation nor cicatrisation after granulation and suppuration. This mode of cicatrisation in wounds of the head especially occurs when these are dressed with pure alcohol; other modes of dressing requiring the formation of granulations for healing. Whatever this dressing may be with regard to other parts of the body, in wounds of the head it seems to be that which gives the patient the most protection from consecutive accidents and leads to the quickest cicatrisation. So treated, these wounds have less tendency to inflammation and suppuration, are cured quickly, and are less often attended with erysipelas and phlegmonous inflammation. (*Gaz. des Hôp.*, August 2nd.)

Artificial Food in Earliest Infancy.—The following results have been obtained by Monkewitz and Kruse, from their experiments made at the Imperial Foundling Asylum, St. Petersburg, on various substitutes for breast employed by them when the nurse's supply is insufficient (two infants being given to each nurse). The articles in use by them were: condensed Swiss milk, Scotch oatmeal, fresh cow's-milk, and Nestle's powder. Children during the first five days of life were almost invariably made sick by any one of the above substitutes, which caused disturbances of digestion, and the rate of mortality was increased. Between the fifth and fifteenth day, the Swiss condensed milk acted the most favourably, one part to nine of water. After the fifteenth day the proportion used was one part to seven, or two parts of this solution and one part of freshly-boiled cow's milk. After the second month Nestle's powder was by far the most satisfactory substitute. At the best, however, the attempt to use artificial food of any kind before the end of the first month gave most discouraging results. The method of employing substitutes with infants during the first five days of life was to alternate the breast with the artificial food, giving the former five times daily and the latter four times. The amount taken at each meal varied from two to three ounces. The attempts to increase the digestibility of cow's milk by the addition of soda or gelatine were not successful. (*The Boston Med. and Surg. Journal*, No. 5, August, 1877.)

Notes and Queries.

NOTES AND CORRESPONDENCE.

Dr. Sheen, of Cardiff, writes to say that he does not agree with Professor Turney regarding the treatment of typhoid fever. At the same time he asks whether Dr. Duckworth does not miss the point of the Professor's paper, viz.: that solid food should be given *from the commencement*, and with the intelligent consent of the patient. This principle does not necessarily deny the danger of giving solid food when ulceration has occurred in the intestines: it rather seems that the Professor's argument is that the *early* giving of solid food will prevent ulceration. Is not, he asks, the intelligent consent of the patient often necessary to the *continuous feeding* with milk? He has often, in practice, found it to be so—that is, it is often necessary to reason with the patient and his friends, and impress upon them strongly the urgent necessity of such continuous feeding.

Oleanodyne.—We have received from Mr. William Martindale a preparation bearing this name, and consisting of a compound of the alkaloids aconitia, atropia, morphia, and veratria with oleic acid. This is quickly absorbed, and forms a strong anodyne liniment, which can be diluted with rectified spirit or oils. It is not so compatible with compound camphor or soap liniment.

Glycerole of Subacetate of Lead.—This preparation, also made by Mr. Martindale, consists of liquor plumbi subacetatis, prepared with glycerine. It has been found useful in eczema, chronic and acute. One part may be mixed with seven parts of glycerine, and the proportion of the glycerole afterwards gradually increased, as the case will bear it, until it is applied of full strength. Mixed with *vasaline* and a little solid paraffin, to give firmness, it forms *unguentum plumbi subacetatis cum petroleo*. This ointment is an elegant substitute for unguentum plumbi subacetatis compositum (Goulard's cerate), as it will keep indefinitely, is always free from rancidity, and forms a bland healing application for ulcerated legs and eczematous surfaces.

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Department of Public Health.

CHOLERA AND PLAGUE.

THERE is no longer any doubt that cholera has appeared in the Hedjaz, and is now more or less prevalent in Mecca and its seaport Jedda. It cannot be said of this outbreak in the "land of pilgrimage," as was said of that of 1865, that it has taken England (or, indeed, Europe) by surprise. For, in the last annual report of the Local Government Board, which we had occasion to notice a short time ago, anxiety was expressed as to an extension of the disease, in 1876, beyond the northern boundary of India into Afghanistan and Beloochistan; it was known that cholera had been spreading from British Burmah to the countries lying eastwards; and in August last a French transport ship—the *Correze*—with seven hundred troops on board, sailing homewards from Saigon, in Cochin China, carried cholera with her throughout the whole of her course into the Red Sea, and did not become free from the disease until she had entered into the Gulf of Suez. Sixty cases occurred on board this ship during her voyage to Suez, of which thirty-two were fatal. It was not difficult to infer from these facts, following as they did upon a considerable epidemic extension of cholera in India, that we were probably about to witness another general diffusion of the disease.

The last great diffusion of cholera began in India in 1863, and in the course of the next five years the disease had spread over the greatest part of the habitable globe. While the latest flickerings of this diffusion were being watched in Algeria and Syria, the disease assumed a fresh epidemic activity in Bengal. Towards the close of 1874 cholera broke out with great virulence in the easternmost districts of the Lower Provinces, and

in the course of the next two years, 1875 and 1876, it spread as an epidemic throughout the greater portion of India. At the end of 1876, as already noted, the epidemic had overlapped the northern frontier of India, and spread into Afghanistan and Beloochistan, reaching as far, in fact, as the Persian frontier. An eastward extension from India had at this time also taken place, and the epidemic was present in parts of Burmah, and, as it would appear also, of the adjacent countries, and of the Eastern Archipelago. In view of this diffusion northwards and eastwards it was improbable that the west would escape, and when it became known that the *Correze* had entered the Red Sea with cholera on board, it was at once inferred that the Hedjaz was in imminent danger. For this ship had crossed the Indian Ocean and entered the Red Sea but a little in advance of many vessels laden with pilgrims from India, the Malay Peninsula, and the Eastern Archipelago, bound for Mecca.

The present outbreak of cholera in the Hedjaz occurs as part of an apparently new general diffusion of the disease, and this fact gives to it importance, so far as Europe is concerned. A further diffusion of the malady is far from improbable, and the Hedjaz, at the time of pilgrimage, presents the most favourable conditions for that diffusion being effected to the basin of the Mediterranean, to Northern Africa, to Arabia, and to Syria. For in Mecca are congregated together during the rites of pilgrimage, under circumstances which experience has shown to be peculiarly favourable to the dissemination of the infection of cholera, crowds of pilgrims from all the provinces of Northern Africa bordering the Mediterranean, from Abyssinia, and from Central Africa, and from all parts of the Turkish Empire, as well as from the far East.

The history of the successive great diffusions of cholera from India, of the mode in which the diffusions have been effected, and of the routes which the disease has followed in the several diffusions, should form a subject of interest to others than medical men. From the social point of view, a work, which has recently been published by Messrs. Macmillan, deserves attention. It is *A History of Asiatic Cholera*, written by Mr. C. Macnamara, Surgeon-Major in the Bengal Medical Service, lately one of the Professors in the Calcutta Medical College,

and now a Surgeon to the Westminster Hospital. This work is especially designed for general use, and it is excellently adapted to give to non-professional readers a knowledge of the great migratory movements of cholera. Another work has also lately been published by Messrs. Macmillan relating to cholera, of peculiar interest with reference to outbreaks of that disease in the Hedjaz and at Mecca, as a centre from which the disease is disseminated. This work is entitled *Cholera Epidemics in East Africa*, and it is written by Dr. James Christie, of Glasgow, late physician to H.H. the Sultan of Zanzibar. The work is not less interesting for its geographical and ethnological details relating to Eastern Africa, than for the valuable information it contains on the movements of cholera on the East African and Arabian Coasts, and in the interior of East Africa. The account it gives of the pilgrimage to Mecca is very full, and furnishes perhaps the readiest source for obtaining a clear knowledge of the circumstances which contribute to give peculiar importance to an appearance of cholera at Mecca at the time of pilgrimage.

Although it is not improbable that the present outbreak of cholera in Mecca may be followed by the appearance of the disease in the basin of the Mediterranean, there are certain chances of escape which must not be overlooked. In the first place there is some reason to believe that the extension of cholera in 1876 beyond the northern boundary of India to the Persian frontier died out there in the following year without spreading into Persia. If this were the case, it may be hoped that the extension of the disease to the Hedjaz may exhibit an equally feeble diffusiveness and die out in that province. Next, the number of pilgrims who assembled at Mecca during the recent pilgrimage was unusually small, as was to have been anticipated. The Russo-Turkish war stopped the pilgrimage from the Mohammedan provinces of Russia, reduced the number of pilgrims from the Turkish Empire to a few hundreds, and almost suspended the pilgrimage from Persia. The greatest contingent of pilgrims came from India, the countries beyond, and the Eastern Archipelago. It is stated that probably not more than 40,000 pilgrims have visited Mecca for the pilgrimage just ended. The day of sacrifice and termination of the pilgrimage occurred on the 16th December. The smaller the

number of pilgrims the less the chance of cholera obtaining great proportions in the Hedjaz, and the greater the likelihood of exercising control over a further dissemination of the disease. Again, the Egyptian Government has virtually stopped all communication between its seaports, and on its land frontier with the Hedjaz, in the hope, not unreasonable under the circumstances, perhaps, of confining cholera to that province. Finally, although since the extension of cholera from the Hedjaz and Egypt to Europe in 1865, the Suez Canal has been opened, and the Mediterranean brought as it were into direct communication with the infected province, this apparent new source of danger may turn out to be in reality an additional protection. Europe (paradoxical though it may seem) is not so much endangered by a direct communication by sea with the Hedjaz as by the intermediate infection of Egypt and the propagation of the disease from that country. The greater the number of pilgrims from Mediterranean ports who can be sent homewards to their destination through the Suez Canal without being permitted to land in Egypt, the less the chance of that country becoming infected. It will be seen, therefore, that there is still a reasonable hope that Europe may escape the danger of cholera threatened from the Hedjaz, but it is well that that danger should be clearly understood and provided against.

While cholera is thus threatening Europe from the south, plague is impending in the east. This disease reappeared in Mesopotamia in the winter of 1873–74, and each succeeding winter, until that of 1876–77 it sprung anew into activity, and prevailed throughout the spring and early summer, dying out apparently with the setting in of the hottest weather. Each year, until 1877, the disease had manifested a greater diffusiveness and increased its area of prevalence, and in 1876 it had passed into South-Western Persia, and showed itself at Shuster (which town had been well-nigh depopulated by plague in 1832) and in the surrounding district. Here a severe outbreak took place, upwards of 2,000 persons being killed by the malady. The loss of life from plague in Mesopotamia in 1876 has been estimated at 20,000. Last year—1877—plague, while showing itself generally over the same area in Mesopotamia within which it had prevailed in the previous year, is reported to have

attacked fewer persons, and to have been less fatal. Hope was therefore entertained that the crisis of that protracted epidemic had passed; and no recurrence of the disease having, as far as is known, happened in Shuster and the adjacent district, it was believed that the anxiety which had been manifested by European nations in the increasing progress of the malady would be allayed. Scarcely had this belief been expressed when it was destroyed. For presently it became known that plague had shown itself at two points in Northern Persia, near to the southern shore of the Caspian Sea. The disease had appeared as a very circumscribed but fatal outbreak in certain small villages in the province of Astrabad. It had appeared also at Resht, the capital of Ghilan, lying on the great trade route between Teheran and the Caspian, and the principal market for Russian goods in Persia. The extent and prevalence of plague in this town is still very imperfectly known. Until towards the end of last year it was generally understood, from such data as were accessible, that the outbreak in the town was slight as compared with the outbreak which had occurred in Bagdad and in Shuster in 1876. It is now known that such was not the case, and there is good reason to believe that the outbreak in Resht last year, proportionately to population, was the most serious and fatal that has occurred since plague, after having apparently become extinct in 1844, has again taken its place among modern pestilences. From Resht the disease spread into the surrounding district, and at one time it was reported to have approached close to the Russian frontier, and suspicions were entertained that straggling cases had found their way through Enzelli (the seaport of Resht), and by way of the Caspian, into Russian territory. Russia, as soon as satisfied of the presence of plague at Resht, stopped all communication with Enzelli, and adopted precautions on the various land routes from Ghilan into Transcaucasia. These measures have only lately been relaxed; and she still maintains a vigilant watch—a watch increased in carefulness rather than diminished by the existing war. For Russia has a lively recollection of the dreadful losses from which her armies suffered by plague during the campaigns of 1828–29 in Armenia and Turkey in Europe.

In Ghilan, unlike Mesopotamia, plague did not decrease and

die out in the hot weather. The disease became less prevalent, but it is uncertain whether it disappeared. The time is now at hand when, if the malady has again become active in Persia and Mesopotamia, the evidence of this activity will be quickly observed.

ON DISINFECTION BY HOT AIR.[1]

BY DR. E. VALLIN,

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When an epidemic of transmissible disease, eruptive fever, or diphtheria occurs in a hospital, statistics show that the cases under treatment there almost inevitably furnish a large proportion of the attacks. Thus in an instance of small-pox, treated in a special ward, of sixty cases received in a quarter, twenty-eight, that is nearly one-half, were individuals under treatment at the time in the hospital for some other malady. This deplorable result is most frequently to be attributed to the insufficient isolation of the special ward and its attendants; but it is dependent also in large part upon incomplete disinfection of the bedding and clothing used by the infectious sick. In reality, when a small-pox patient dies, or has quitted the hospital, what is done with the coverlets, the pillows, the mattress which he had used? Too often we are content if these articles have been exposed to the air during a few hours in the sun, have been well beaten also in open air, as carpets are beaten. In this manner clouds of dust are disseminated, composed, in great part, of variolous pus globules and virulent epidemic cells, and it is a miracle that it does not oftener find a fertile soil.

When the bedding and clothing betray obvious marks of suppuration, they are washed, the woollen, or hair, or feather stuffing of the mattress is beaten and teased out, and then returned into store preparatory to its further use—it may be by a patient admitted for a sprain or a whitlow, and who is thus exposed to the contagion of small-pox. Strong measures to obviate such transmission are taken only in face of an epidemic, when public attention is awakened to the fact. No doubt the majority of hospitals have printed instructions,

[1] A Paper read before the Society of Public Medicine, Paris.

describing, at times minutely, the measures of disinfection to which articles which have been exposed to contagion should be subjected. In some hospitals even, there is a special chamber for fumigations by sulphur or chlorine, but this chamber has sometimes been devoted to other purposes, or its existence almost forgotten. It would be interesting to know what quantity of sulphur and of hydrochloric acid has been used for purposes of disinfection in each hospital during a year.

Fumigations to be efficacious need competent supervision. They cause a disagreeable and very tenacious odour; they often destroy the colours of tissues exposed to them, deteriorate metallic materials, and subject to danger of fire and destructive change articles for which the administration is responsible. This fear of deterioration of the things fumigated is the real, and, I believe, legitimate obstacle to the application of such measures of disinfection which medical men call for in hospitals.

In several neighbouring countries it is held that a surer and easier applied means of disinfection than by fumigation is to be had from heat, and attempts are being made to introduce this practice, not only into hospitals, but also into the sanitary administration of the general population. Thus, for example, there exists in London, in Golden Lane, Barbican, a wretched and populous quarter, side by side with a *mortuary*, where the corpses of those who die from contagious and other diseases can be deposited pending their burial, chambers for the disinfection by heat of infected articles of clothing and bedding, &c., with store houses, and a dwelling for the persons in charge. Again, in Liverpool there were established in 1866 and 1868, in opposite quarters of the town, public disinfecting chambers. One set of chambers is situated in Forth Street, in the north of the town; the other in New Bond Street, in the south. These establishments were so favourably regarded by the public during the epidemic of cholera in 1866, that in one alone 17,000 articles of bedding and clothing were received and disinfected in that year.

Numerous hospitals in England and in Germany have established, adjoining their baths, hot-air disinfecting chambers, where are purified daily the bedding and clothing of the sick suffer-

ing from infectious disorders. We may note especially the hospitals at Nottingham (Ransom), Southampton (Lake), Edinburgh (Fraser), Munich (Thorr), Berlin (la Charité, Esse; the hut hospital, Steinberg), Stettin (the lazaret, Petruschky), Belgium (the military hospitals, Vleminckx). In nearly all these establishments the apparatus have been in work several years, in some day and night without interruption. The practical experience of their use is complete, and the results everywhere very satisfactory. It is important, then, that this subject should receive the attention of French hygienists, and it is important also that an apparatus of the kind in question should be introduced into Paris, either at a hospital or in a public washhouse, with a view of making general use of such apparatus in hospitals obligatory, should experience of its working confirm the results obtained abroad.

The problem to be considered comprehends three questions, that I propose to discuss successively:—

1. At what temperature do fabrics (textile) begin to undergo alterations?

2. What temperature is necessary for the destruction of active morbid principles?

3. What is the most advantageous form to give to an apparatus?

1. At what Temperature do Fabrics (textile) begin to undergo Alteration?

Speaking generally, woollen tissues alter more rapidly than those of cotton. It is necessary to distinguish those alterations which slightly affect the colour of the fabrics from those which affect its texture. According to my experiments white wool, at a temperature of 230° Fahr., begins to manifest a very slight reddish tint, without any diminution in the cohesion of the material; at 302° Fahr., the same material acquires a more marked yellowish tint, and at the same time first exhibits apparently a slight alteration in its cohesiveness.

Let us give attention, then, for the moment, to the action of heat upon coverlets of white wool. The observations made on this subject by others who have experimented with hot air disinfecting apparatus are somewhat contradictory.

Ransom,[1] who has written the most complete memoir on the subject, states that white wool, cotton, linen-cloth, silk, and paper, can be exposed to a heat of 249·°8 Fahr. for three hours without appreciable change. The wool, however, presents a very slight alteration of colour, especially if it be new, an alteration, he thinks, which may perhaps not be unlike that which occurs in flannel when it is washed once only. If the same temperature is continued for seven or eight hours, slight changes of colour are noted, but without any other alteration of the white wool, the cotton, the silk, &c. Further, he states, that at a temperature of 294·°8 Fahr., continued about three hours, white wool singes a good deal, cotton and linen cloth less, but that in other respects the appearances of these fabrics is not seriously compromised. If this temperature is continued five hours the exterior change is manifest, and the texture is probably altered, fabrics of spun wool become dusty, they lose weight slightly in washing, but their resistance does not appear diminished, especially if they are suffered during several hours to acquire their normal humidity, which has been driven off by the heat. Ransom has also investigated the question of the length of time required for the penetration of the heat into the central parts of thick articles, and he gives the result of numerous experiments in the following table.

	Temperature of apparatus.	Duration of exposure.	Central temperature.	Loss of weight.	Scorching.
	Deg. Fahr.		Dg. Fh.		
Hair pillow, $5\frac{1}{4}$ inches thick, normal humidity	249·8 to 262·4	8h.	246·2	$\frac{1}{10}$th	None.
The same, nearly dry.	248	2h. 40m.	221·0	$\frac{1}{40}$th	None.
White coverlet, in 24 folds, $4\frac{3}{4}$ inches thick, damp. . .	248	6h. 50m.	213·8	$\frac{1}{12}$th	A little; no deterioration.
Feather cushion, $5\frac{1}{4}$ inches thick, damp	240·8	7h. 20m.	231·8	$\frac{1}{10}$th	None.
Wool cushion, $5\frac{1}{4}$ in. thick, damp . . .	237·2 to 244·4	23h.	251·6 ?	$\frac{1}{10}$th	None.
Hair pillow, $5\frac{3}{4}$ inches thick, dry . . .	294·8	4h. 45m.	294·8	$\frac{1}{17}$th	Scorched, texture altered.
Wool cushion, $5\frac{3}{4}$ in. thick, damp. . .	298·4	10h. 30m.	280·4	$\frac{1}{10}$th	Ditto.

[1] W. H. Ransom, "On the Mode of Disinfecting by Heat." (*The British Medical Journal*, Sept. 6, 1873, p. 274.)

Ransom concludes that a temperature of from 248° Fahr. to 257° Fahr. continued from an hour to an hour and a half is effective as a disinfectant and does not injure the tissues exposed to it.

De Chaumont,[1] the successor of Parkes in the Military Medical School at Netley, has repeated these experiments and has arrived at the following results :—1. Woollen articles are more quickly changed by heat than articles of cotton or linen. 2. Woollen articles begin to lose their colour after an exposure for six hours to a dry heat of 212° Fahr., or after two hours exposure to a temperature of 221° Fahr. Beyond these limits the change increases with the duration of the exposure or the elevation of the temperature. 3. Cotton and linen fabrics may be exposed with impunity for six hours to a temperature of 212° Fahr. and for four hours to a temperature of 221° Fahr. In brief, according to De Chaumont, the exposure ought not to be prolonged more than six hours at a temperature of 212° Fahr., or more than four hours at a temperature of 221° Fahr. Here is one of the tables in which he summarises the observations made upon white woollen coverlets.

Fahr. 212°	2 hours.	—No change.
	4 ,,	—Ditto.
	6 ,,	—Very slight yellowish shade.
221°	2 ,,	—Very slight yellow tint.
	4 ,,	—More marked yellow tint.
	6 ,,	—Ditto.
	14 ,,	—Very marked yellow tint.
230°	13 ,,	—Marked yellow tint upon a plate of iron.
	14 ,,	—Very marked yellow tint upon a plate of porcelain.
248°	9 ,,	—Very marked yellow colour.

Thus, while Ransom states that the temperature can be elevated to 248° Fahr. for three hours without apparent alteration of woollen tissues exposed to it, De Chaumont declares that a temperature of 221° Fahr. continued during two hours may give rise to changes. The question is important from a practical point of view, because if the means of disinfection proposed by physicians are such as to cause injurious or destructive changes in the articles exposed to them administrators and responsible agents will hesitate to make use of them.

[1] De Chaumont, "Reports on the Effects of High Temperature upon Woollen and other Fabrics." (*The Lancet*, 11th Dec., 1875.)

I have, under these circumstances, thought it well to repeat these experiments, and here is the result at which I have arrived. Let me presume that it is requisite in conducting them that the temperature should be equal in all parts of the apparatus. Air is a bad conductor, and the diffusion of heat in it is so difficult that the walls of the chamber or the tables supporting the articles exposed have nearly always a temperature superior to the contained air. Tissues are thus apt to become overheated and scorched at the points of contact with their supports, unless these are covered with wood or other material of low conductivity. Now it is nearly impossible during an exposure for two hours to a heat 230° Fahr. to preserve the brilliant whiteness which undyed woollen tissues have when new. Such exposure gives to them a yellower tint than that which occurs after a first washing in hot water. This is so marked that after submitting a piece of flannel, which has already been carefully washed, for three hours to a temperature of 230° Fahr., it cannot be distinguished in tint from a piece which had been submitted to this temperature only. But the difference of tint becomes obvious when the flannel is exposed for not less than two hours to a temperature of from 239° Fahr. to 248° Fahr.

As to cotton and cloth fabrics, a temperature of from 230° Fahr. to 239° Fahr. does not cause any appreciable change of colour; a manifest change is observed only after exposure for more than two hours to a temperature of 257° Fahr.

The cohesiveness of the fabrics does not become altered except at very elevated temperatures. Strips of a woollen fabric were taken: some of these were immediately subjected to traction with a dynamometer, and torn under a force varying from 57 lbs. to 57½ lbs. Similar bands submitted to traction after exposure to heat, broke as follows:—

Temperature, Fahr.	Duration of exposure.	Tearing force.
230°	4 hours	57½ lbs.
248°	4 ,,	57 lbs.
266°	2 ,,	57 lbs.
302°	2 ,,	25 lbs.–23½ lbs.

It is, then, solely at a temperature of about 302° Fahr. that woollen tissues begin manifestly to lose their cohesion.

We have endeavoured to ascertain whether wool or hair became less cohesive and more friable under high temperatures. Great weight of these articles, well beaten, were subjected to experiment. Some samples were exposed for four hours to a temperature of 248° Fahr., then removed from the stove and again beaten, when they left behind a thin layer of detritus and fragments. If the beating had taken place twenty-four hours after the removal of the samples from the stove, there having been time for them to recover their hygrometric water, the quantity of detritus would not have been greater than that observed after beating the wool or hair previous to exposure to heat. This explains an observation made by Dr. Lake, of the Southampton Infirmary. Mattresses were disinfected by an exposure for eight hours in a stove heated to a temperature of from 239° Fahr. to 248°. The attendants observed that after beating the material and making the bed, the loss of stuff was greater when the operations were carried out immediately after removal from the stove than when they were carried out two or three days after, when, indeed, there was no appreciable loss. Dr. Lake, moreover, discovered that a temperature of 248° Fahr. was too great, and that one of 221° Fahr. was sufficient.

It has seemed to me that the yellow tint of white woollen fabrics is much more marked when the air is driest. If a shallow vase filled with water be placed in the stove, notwithstanding that the humidity of the over-heated air produced by the evaporation never approaches saturation, yet it appears to render the change of colour in the material slighter, and to diminish that sense of dryness and harshness to the touch which it retains for some time after being removed from the heated dry air.

2. What Temperature is necessary to Destroy the Activity of Morbid Principles ?

Eruptive Fevers.—W. Henry, of Manchester, who was one of the first to advocate the use of apparatus for disinfection by hot air, has proved that the temperature of 140° Fahr. suffices to destroy the activity of vaccine lymph. Inoculating children on one arm with natural vaccine lymph, and on the other with the same lymph after it had been heated to 122° Fahr. for

the space of one hour, he found that the vaccine pustules were developed on both arms. On the other hand when the vaccine lymph had been heated to 140° Fahr. for an hour not a trace of pustule was produced by its inoculation. Quite recently Dr. Baxter [1] has repeated these experiments on vaccine lymph, as also Dougall and Mecklenburgh. Dr. Baxter found that exposure of vaccine lymph to a temperature of 176° Fahr. for thirty minutes invariably rendered it inert. These experiments to a certain degree authorise the conclusion that the virus of small-pox would be affected in a similar fashion by heat.

The activity of the transmissible principle of scarlet fever appears, according to W. Henry, to be destroyed when subjected to a temperature of 203° Fahr. for four hours. The experiment from which this deduction was made is now, however, beyond cavil. This physician collected the under-clothing of four children attacked successively with scarlet fever, and having exposed several articles to a temperature of 203° Fahr. for from four to five hours, he then caused his own children, aged respectively six, ten, twelve, and thirteen years, not one of whom had suffered from the disease, to wear them for several days. None of the children contracted the malady.

Yellow Fever, Plague, &c.—Harries and Shaw, who consider that both yellow fever and plague are incontestably transmissible, state that they have demonstrated that a temperature of 212° Fahr. destroys the contagion of yellow fever. Woollen clothing removed from the plague-stricken, after having been exposed for twenty hours to a temperature of from 143°·6 Fahr. to 170° Fahr. has been worn for a period of fourteen days by fifty-six persons without any of them contracting the disease. We are unaware of any decisive instance of the destruction of the germs of typhus by heat. The experiment of W. Henry, who breathed with impunity for four hours with the mouth and nostrils placed above flannel-jackets which had been worn by a female suffering from petechial typhus, but which had subsequently been exposed to a temperature of 203° for two hours, has no real value.[2] It is

[1] Report to the Privy Council. (*Lancet*, 1876, vol. i. p. 504.)

[2] Dr. Vallin probably had not the original text of Dr. Henry before him when he wrote his memoir. Dr. Murchison sums up Henry's experiments as to

generally believed that a temperature of 212° neutralises the poison of cholera. This is not unlikely, but the opinion does not rest upon rigorous experiment.[1]

Charbon, Parasitic Maladies.—M. Davaine,[2] as the result of experiments made with decreasing temperatures, has shown that at a temperature of 131° Fahr. the activity of the liquid virus of charbon is always destroyed in five minutes, and that at 12 3·8 it does not lose its virulence until after a quarter of an hour. The recent works of Kock[3] have shown that the bacteria of charbon or *Bacillus anthracis* are readily destroyed while their development is incomplete, but that when the *Bacillus* has fructified and is charged with spores, these latter are not easily affected by physical or chemical agents. It will be necessary then to repeat the experiments of Davaine and ascertain if a temperature of 131° is capable of destroying the virulence of a liquid containing the spores of the *Bacillus anthracis.* But here it is necessary to make a distinction applicable not only to the virus of charbon but also to other morbid matters which appear to derive their activity from protorganisms. The

scarlet-fever and typhus as follows :—"In four different instances, flannel waistcoats taken from patients labouring under scarlet-fever were exposed for some hours to a dry heat of 204° Fahr., and were then worn with impunity by children who never had the disease. Three flannel jackets were taken from a typhus patient and exposed for some hours to a temperature of 204° Fahr. One was kept under the nostrils of a person in health for an hour and three-quarters ; a second was worn next the body of the same individual for two hours ; while the third was shut up in an air-tight cannister for some days, and then kept for some hours within twelve inches of the face of the same person, a current of air being directed across the flannel to the face. No result followed, although the person had been fasting for eight hours and was much exhausted by disease, so as to predispose him to typhus. These observations, although perhaps insufficient for the purpose of scientific demonstration, afford strong presumptive evidence that dry heat is a powerful disinfectant agent in typhus. Owing no doubt to their doubtful propriety, Dr. Henry's experiments have not been repeated ; but where the principle advocated by him has been acted on, the results have been satisfactory."—*Treatise on Continued Fevers,* 2nd ed., p. 97, TRANS.

[1] This opinion is opposed to the results of Messrs. Lewis and Cunningham's experiments on this subject. These showed that cholera evacutions are rendered no less but rather more poisonous by boiling.—*Report of Microscopical and Physiological Researches into the Nature of the Agent or Agents producing Cholera. Second Series,* 1874, p. 56.

[2] "De l'Action de la Chaleur sur les Virus Charbonneux" (*Academie des Sciences,* 29 Septembre, 1873, et *Gazette Hebdomadaire,* 1873) 657.

[3] *Revue des Cours Scientifiques,* Janvier, 1877.

bacteridia of charbon are destroyed in a liquid heated to 131° Fahr., but they retain their noxiousness when, after having been quickly dried, their powder is submitted to 212° Fahr. On mixing a little of this powder with water, a liquid is obtained which rapidly kills animals inoculated with it. The same observation has been made as to a great number of protorganisms. The *penicillium glaucum*, *l'oidium aurantiacium* continue to live after having been exposed to a temperature of even 260° Fahr. Nevertheless M. Pasteur considers that the death of these organisms is almost inevitable when subjected to a temperature of 230°, and that the greater number are destroyed at a much lower temperature.

Septicæmia, *Septic Poisons*.—The recent discoveries of M. P. Bert relating to the different action of compressed oxygen upon viruses, properly so-called, and upon parasitic protorganisms, opens a new field of study. It would appear, in effect, that elevated temperatures, as compressed air, destroy only the animated germs, leaving intact the amorphous viruses. M. Davaine has shown that prolonged ebullition does not destroy the virulence of septicæmic fluid. Panum,[1] after distilling during eleven hours a septic liquid, obtained an inert distillate, whilst the extract, even after it had been treated by boiling alcohol, preserved all its virulence, and destroyed in a few hours animals inoculated with it.

If these results are confirmed, it will follow that the septic poison is the most formidable of the poisons which the physician and hygienist have to combat. It will be necessary to admit in this case that heat, even when carried above 212°, is not a sufficient disinfectant. This exception is to be regretted, but it does not invalidate the fact that in heat we possess a precious and easily applied agent, capable of neutralising nearly every other morbid poison.

[1] "Le Poison des Matières putrides, les Bactères, l'Intoxication putride et la Septicæmie," traduit des *Archiv* de Virchow, b. lx. p. 301, in *Ann. de Chimie et de Physique*, 1876, t. lx. p. 350.

(*To be continued.*)

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Original Communications.

GLYCERINE IN THE TREATMENT OF INTERNAL HÆMORRHOIDS.

BY GEORGE B. POWELL, L.R.C.P. EDIN., NOTTINGHAM.

In the January number of the *Practitioner* there is an interesting contribution to the therapeutic value of glycerine in the treatment of internal hæmorrhoids.

My experience of it in this troublesome and painful complaint may not be uninteresting, and may be of service to many a busy practitioner.

The results of its administration have been so striking and satisfactory as to render needless on my part any apology for trespassing upon your valuable space. My first case was so extraordinarily rapid and successful, that I hesitated to publish it till further trials had convinced me that the results obtained were due undoubtedly to the drug.

Mrs. B., aged fifty-eight, requested my attendance on January 16th to prescribe for a troublesome cough, to which she had been of late years subject at this particular season; there was simple catarrh of the larger bronchi, with scanty expectoration; she likewise intimated parenthetically that she had been for years affected with the "bleeding piles," and for the last two years the tenesmus and discharge of slimy mucus, mixed with blood, had

been particularly severe, running from her in bed, and "shooting from her when she coughed." She did not expect any relief for the latter affection, but thought if her cough was improved it would give her a modicum of comfort. From her own statement she had had no proper sleep for two years in consequence of the tenesmus and constant irritation in the lower bowel. I may add, from her own report, everything had been tried to relieve the tenesmus, suppositories included, without effect.

I prescribed a mixture composed of glycerine, ℥iss; acid. citric. ʒij; morph. acet. gr. i.; vin. ipec., ʒij.; aquæ ad ℥viij.; ʒi ter die.

My next visit was on the 19th, and I was agreeably surprised to find the tenesmus and discharge entirely ceased, and although the cough had not improved, she could pass a comfortable night, and "felt better than she had done for years." The cough continuing distressing, she desired to discontinue the medicine which had exercised so beneficial an influence over the lower bowel, as she considered the sudden stoppage of the discharge made her cough worse. To a certain extent she was right, for as the cough improved, all the former painful symptoms reappeared, though in a minor degree. She then returned to the use of the glycerine, and after two bottles she expressed herself as well as ever she was, and up to this date, March 9, she has continued well.

My next experience was in the case of a man of intemperate habits, who, "after a spree" invariably suffered from bleeding piles, with great pain on defecation. I prescribed the glycerine with citric acid and tincture cardam. co., and saw nothing more of him for three weeks, when I met him accidentally, and on inquiry found he had been completely cured by the one bottle. In two other cases of hæmorrhoids, one occurring in pregnancy, great relief was afforded.

I am convinced we have in glycerine a therapeutic agent of great value. I am inclined to believe its action on the rectum to be of a specific nature, but its *modus operandi* I am unable to speculate upon with my present experience.

In the hæmorrhoids of drunkards, it will be found perfectly reliable and effective, and administered with citric acid and tincture cardam. co. forms a pleasant and agreeable mixture.

ON COD-LIVER OIL.

BY WM. J. RUSSELL, M.D., CLAPHAM.

VARIOUS opinions have been held regarding the curative qualities of cod-liver oil. The late Professor Hughes Bennet, by whom the use of cod-liver oil was first introduced into this country, was accustomed to regard the darker qualities of oil as the best. Medical opinion has latterly come to regard the paler varieties with more favour, but my own experience leads me to agree with Dr. Hughes Bennet. My attention was drawn to the different kinds of oil when attending a phthisical patient during winter in the small fishing town of Anstruther. The patient's family history was decidedly phthisical. She was considerably emaciated and was subject to harassing cough, accompanied by purulent expectoration, night sweats and hectic fever ; on percussion there was dulness at the apices of both lungs. Her most distressing symptom, however, was constant nausea and vomiting after food. The medicinal treatment consisted of simple bitter tonics and cod-liver oil, which she was at first unable to tolerate, the oil invariably producing vomiting and retching. Being strongly impressed with the importance of persevering in the treatment, she of her own accord suggested trying different samples of oil ; to which I assented, not expecting to get a more digestible or palatable oil, but hoping that the stomach might acquire a certain amount of tolerance, and some part of the oil be retained, if it were perseveringly taken. Some time afterwards, on making my daily visit I was surprised and delighted to hear that the last sample of oil had not been vomited, and up to that time—some hours—had not caused much nausea. This last oil was denser in appearance, somewhat like unboiled linseed oil, and slightly darker in colour than the previous samples, which were

clear and looked thin like water. Under its continued use the symptoms began to subside, the cough and expectoration diminished, the night sweats and hectic fever disappeared; she constantly gained weight, and when I ceased attending her had almost recovered. I subsequently tried this darker, unmixed, true cod-liver oil on several patients, and had ultimately every reason to believe that it was the most easily retained and the most effective.

The mode of administration was as follows:—The mouth was first gargled with strong salt water to deaden the nerves of sensation; the oil was then taken by itself, and succeeded by a draught of fresh water, to wash it down and prevent it sticking to the mouth. With a view to prevent sickness, pepper was sometimes taken before the oil. On inquiry, I found the darker, denser oil had accidentally been made from the livers of the true cod (Gadus morrhæ) only; the usual practice being to include the livers of the closely allied species—haddock (Gadus æglefinus) and ling (Gadus molua). It was much more offensive to taste and smell than the clear oil from the mixed livers, which had a bland taste and very little smell. Four bottles of the different samples of oil being kept on the window-sill of the patient's bedroom: after a freezing night I noticed that the bottle of darker oil was concrete almost to the top, thus showing a very large proportion of margarin, and that the oil with least smell had very little frozen in it. When the darker oil was vomited it was generally within the first three or five minutes, and was apparently due to nausea, caused by its effect on the nerves of taste in the mouth and throat: if retained longer than five minutes it usually caused no uneasiness beyond an occasional slight feeling of nausea. The mixed clear oil and the oils of the haddock and ling are readily taken, and when retained seem equally efficacious; but are much more apt to cause nausea and vomiting some little time afterwards, generally from a quarter to half an hour after taking. This is probably due to decomposition of the oil and formation of acrid fatty derivatives in the stomach, while the darker true cod-liver oil seems to be absorbed without decomposition. Fresh cream, with its own bulk of grated biscuit and a small proportion of brandy, is retained by phthisical children, where nothing else can be kept on the stomach.

Emulsions of oil, especially those containing phosphorus, are sometimes rejected where pure oil can be taken, apparently from the same cause. I am inclined to think that the oil of the true cod contains either a greater number or more in quantity of the peculiar ethers and extractive matters than the oils of the allied species of fish, and that to this is due its being more easily absorbed by the stomach—as we see in well-cooked meat which develops a number of flavouring ethers.

The process of manufacture of the oil, considerable quantities of which are made in the town, is as follows:—

The fish are gutted as soon as landed, and the livers are thoroughly washed, all the bad pieces being cut off, and livers of diseased fish, which are frequently ulcerated and contain parasites, are rejected. While the fish are being gutted the livers are placed in large tubs, and as soon as possibe are placed whole in the boiler; steam is not approved of, but slow heat from a coal fire is used; the oil should come up cool to the top, and is skimmed off with a large spoon, and after standing twenty-four hours it is strained through linen and stored for use. The more heat used the darker the oil, and that which rises first is generally thought to be the best. The livers are afterwards used for manure.

ON THE ACTION OF THERMAL APPLICATIONS TO THE SKIN UPON THE CIRCULATION IN THE BRAIN AND OTHER ORGANS.[1]

BY DR. WM. WINTERNITZ.

Docent for Medicine in the University of Vienna.

By the application of different temperatures to the surface of the body we are able to cause alterations not only in the vessels of the part to which the heat and cold are directly applied but in those of the rest of the body. By applying cold to the surface we cause contraction of the vessels at the point of application, and by warmth we make them dilate. The application of heat to a circumscribed spot of skin will cause reflex alterations in the circulation in distant parts, and in this way it is possible to regulate almost at will the amount of blood in various organs. But the quantity of blood is not the only thing to be taken into account, for the pressure of the blood in the vessels of any part is one of the most important factors in nutrition and functional activity. Alterations in the blood-pressure are undoubtedly of the greatest importance in reference to tissue change in any organ, for upon the pressure of blood in the arteries depends the rapidity of the circulation and the constancy of the current in the small arteries, in the capillaries, and in the veins. Upon the blood-pressure and the rapidity of the circulation, again, depend secretion, excretion, and the various processes in which diffusion plays a part. These two factors, the pressure of blood in the vessels, and the rapidity of the circulation in every

[1] Freely translated by the Editor at the Author's request from his work on *Hydrotherapie.*—Ed. Pract.

organ, as well as the functional activity which they produce, depend upon the anatomical conditions of that organ, such as the angle at which twigs are given off from the parent vessels and the distribution of the capillaries. The anatomical relations are a constant condition upon which we may reckon, but nevertheless, apart from these, the varying rapidity of circulation and blood-pressure alter the nutrition and function of a part under physiological and pathological conditions.

The amount of blood in the living body is constant, and cannot be rapidly increased nor rapidly diminished except under the influence of mechanical injury and such-like. The vascular system forms an hydraulic arrangement of closed tubes in which the pressure can only be greatly increased or diminished either by sudden increase or diminution in the propulsive power of the heart or sudden alterations in the capacity of the vessels. We can exercise great influence over both the propulsive power of the heart and the capacity of the vessels by thermal and mechanical stimulants, and the pulsations may be rendered quicker or slower, and the contractions of the heart more or less powerful by the action of heat and cold. The question now arises, Can the dilatation or contraction of the vessels in a large vascular district of the body influence the amount of blood and the blood-pressure in other vessels the size of which remains unaltered? We must seek to answer this question by means of physiological experiment. Golz has shown that by repeatedly tapping the abdomen of an uninjured frog the heart can be made to pulsate more slowly, and may even be brought to complete still-stand in diastole. When the tapping ceases the heart generally remains for some little time afterwards in a state of still-stand, and when it again begins to pulsate its condition is the same as if the animal had lost an enormous quantity of blood. The venæ cavæ remain almost empty, the circulation in the web ceases, and arteries which are cut through hardly bleed at all. Where, then, is all the blood, since no vessel has been injured, and no blood whatever has been lost? On *post mortem* examination of the animal Golz found that, after tapping, the vessels of the mesentery, and especially the veins, were enormously dilated and distended with blood, although none of them showed any solution of continuity whatever. The

condition here is that the vaso-motor nerves, which have been affected either directly or reflexly by the irritation, have become stimulated to excess and paralysed, and the vessels which they control have become dilated. The excessive mechanical stimulation has produced a loss of tone in the same way as other stimuli, for example, the continuous application of cold, are apt to do.

What influence, then, has such a loss of tone in a large vascular district upon the conditions of the circulation in the body generally? As soon as the capacity of the vascular system generally has been greatly increased by the relaxation of the muscular walls of a large vascular area, the vascular system can no longer remain distended with blood as it normally is. The heart, at each systole, sends a portion of blood into the arteries, which receive it readily without becoming distended, because they can now contain more blood than they formerly could. In the same way, the relaxed veins also retain the blood which pours into them in order to fill the extra room which is now at their disposal. The quantity of blood in the relaxed vessels thus becomes increased at the expense of the normally distended vessels. The former take away from the latter the blood which they ought to contain, and which normally keeps them distended. But as soon as the tension in the vessels decreases or disappears the functional activity of the heart itself becomes more and more affected. At first the large veins are still distended, and they empty the excess of blood they contain at every diastole into the heart, which drives it, at each systole, into the dilated vessels. These, however, retain the greatest part of it, so that very little of it flows into the large veins and back to the heart. The tension in these veins quickly sinks, and smaller and smaller quantities of blood pass into the heart at every diastole. Thus, loss of tone in a large vascular area causes a diminution, or even complete loss of tension, in all the remaining vessels, which still retain their normal tone. If loss of tone paralyses the activity of the heart, a diminution in it, or a lowering of the general tension in the vessels, will diminish the work done by the heart, and, on the other hand, all other things being equal, an increase of tone will increase the work effected by the heart. Analogous changes

in the distribution of blood are produced by division of the splanchnic nerves, as has been shown by Asp and others, and has also been recently demonstrated in a very striking manner by von Basch. After division of the splanchnics the vessels of the abdomen dilate, just as in Golz's tapping experiment, probably from paralysis or inhibition of the vaso-contracting nerves. The vaso-dilating nerves, which are probably of spinal origin, thus preponderate. The blood is, as it were, sucked into the dilated vessels. Those vessels in which the tone still remains normal at first contract and try to accommodate themselves to the diminished amount of blood in them, but finally, as I have just shown, this amount becomes altogether insufficient to fill them, and thus they lose their normal tension. Thus it is that the vessels in all the other parts of the body, except that district in which the dilatation has occurred, become contracted to their utmost, and their contents are reduced to a minimum. The part which they ought to supply with blood becomes pale, and presents all the signs of anæmia. Thus, in the eye, where such a condition is readily visible, von Basch and Hök found contraction of the retinal vessels and paleness of the eye in animals, after section of the splanchnics. This anæmia, which occurs in other organs as well as the eye, explains the disturbances of function which are observed in them. An entirely opposite effect is produced by the contraction of the vessels of a large vascular area. Physiological experiments show that this causes hyperæmia in neighbouring vessels, or even in all the other vessels of the body. If the peripheral ends of the splanchnics be irritated, the abdominal vessels contract, and immediately the vessels of the district, which had previously been rendered anæmic by the division of the splanchnics, become dilated and distended with blood, as the authors just named have observed in the retina.

We thus see that in the abdominal vessels, controlled as these are by the splanchnic nerves, we have an apparatus for regulating the blood-pressure in the body generally, and that increased tension in any vascular district of the body may be compensated by dilatation of the abdominal vessels. There are also other arrangements besides which serve to compensate quickly and effectually for the diminution or increase of capacity in any vascular area. It is thus evident

that if we except such extreme alterations as those occurring in Golz's experiment, contraction or dilatation of a vascular province may remain entirely without influence on the general blood-pressure, inasmuch as vessels of other districts may compensate it by contracting or dilating in an inverse sense. It is only thus that we can explain Horvath's observation that covering the whole body of an animal with snow had no effect upon the blood-pressure.

But if we are able by ordinary means to alter the general blood-pressure merely to a slight extent and generally only for a short time, we can yet influence the distribution of blood very effectually. We can regulate the amount of blood passing to any given organ in the most positive way. If we remember that the activity of an organ depends upon the tissue change in it, and that the blood is one of the chief factors in determining the tissue change, inasmuch as it conveys to the organ the oxygen which is absolutely requisite for this change as well as a great part of the chemical materials necessary for it, we are justified in concluding that the tissue change and the functional activity of any organ rise and fall with the amount of the blood passing to it, other conditions being equal. But as the total quantity of blood in the organism is tolerably constant for short periods of time, the supply of blood to other organs must be proportionally diminished by its increased flow to any one. Ranke has shown that this altered distribution of blood is the chief factor in the physiological tissue changes which accompany functional activity in an organ. He demonstrated that under normal conditions there is an exchange between the activity of single organs in the animal body of such a kind that, with increased activity of one, there is diminished activity of another or of all others, and the amount of blood in the organs undergoes parallel and similar alterations with the functional tissue change. The active organs become full of blood, those which rest become anæmic. When one organ or group of organs becomes more active the activity of one or of all others becomes correspondingly diminished. "The amount of the decomposable blastema, plasma, or circulating albumen," says Ranke, "remains the same, but decomposition occurs with increased or diminished

intensity alternately in different places according to the rest or activity of individual organs."

Ranke demonstrated also that the amount of blood in the locomotive organs of the body and therewith the proportion they take in the total tissue change is increased when they are at work. At the same time the amount of blood and the proportion of the total tissue change in the glandular apparatus correspondingly diminish. Experiments on the varying intensity of tissue change in individual organs during activity and rest completely confirm the conclusions respecting the connection between activity of function and tissue change in organs which have been arived at by determinations of the amount of blood and its distribution in them.

Voit has also expressed the same idea as follows:—"The current of the juices in each organ is regulated by the decomposition going on in it, inasmuch as more blood streams through a gland or through a muscle during action than rest. The blood is distributed very differently, and tissue change goes on very unequally in the body at different times. During active digestion we find that the vessels of the intestinal canal and the glands connected with it are distended with blood. A large proportion of the total blood is diverted into them in order to perform the most varied work. At that time we are unable for other bodily or mental work if we do not wish to arrest digestion." If the muscles are violently and actively used the activity of our brain cannot be so great. This law of the exchange of functional activity between different organs and the conditions determining it, viz : the altered distribution of blood, also affords to therapeutics efficient means for removing abnormal conditions of nutrition. In contra-distinction to the mode of action of other remedial measures we here find a basis for actual physical hydraulic therapeutics.

The whole so-called derivative method depends upon the principles I have just sketched.

During the condition of rest and inactivity the vessels of the respective organs are contracted. It is, then possible that single capillary systems may allow no blood whatever to pass, and the blood necessary to the nutrition of the organ itself may be conveyed to it by the larger vascular twigs

only. But on the application of certain stimuli, the vessels of the organs in question dilate and become full of blood up to their minutest branches. The amount of blood in the vascular district thus irritated becomes greately increased, and from the enlarged capacity of the vessels we may conclude approximately that in many organs the circulation is increased ten or twenty times, or even more.

When a pathological process depends upon increased flow of blood to any organ, we must endeavour to lessen the amount of blood flowing to it by dilatation of the vascular districts at a distance from the seat of disease and to divert the circulation directly from it. If, however, the pathological process depends upon diminished flow of blood to any organ, we must try to increase the circulation to the anæmic part, to divert the blood to the seat of disease by producing contraction of vessels in a large vascular area in some other part of the body.

We will now consider the utility of local or general thermal applications to the surface of the body, from the point of view afforded by the physiological experiments just described. The contraction or dilatation produced in a large vascular area by the external use of water must evidence itself by contrary appearances in other vascular districts, in the same way as in these experiments. This law was long since surmised, and has long been a rule of therapeutics. It is only recently, however, that it has been scientifically established by the experiments of Schüller which we will now describe at some little length, as far at least as they bear upon the subject we are now discussing. Schüller trephined the parietal bones of a rabbit on both sides of the sagittal suture, and observed the vessels of the pia mater. A careful study of the normal appearances enabled him to estimate exactly the alterations which appeared in the vessels under the action of various agents. It is interesting and important to know, that even pressure upon the abdomen of the animal was sufficient to produce dilatation of the veins of the pia mater, and sometimes also of the arteries. This appearance is explicable by the mechanical interference with the return of venous blood. Pieces of ice laid upon the dura mater, produced powerful contraction of both arteries and veins, which continued for thirty seconds after the removal of the ice, when it had been

applied for ten seconds. In most of the animals experimented upon, the superior ganglion of the sympathetic had been removed on one side, and on the corresponding side of the pia mater the application of ice had little or no effect upon the vessels. A cold wet compress upon the belly or back of the animal produces, almost without exception, immediate and persistent dilatation of the arteries and veins in the pia mater. Their pulsations become more plainly visible, and at the same time slower; the respirations become deeper and slower. After the termination of the experiment, the dilatation sometimes continues for a short time and then is succeeded by a contraction which generally passes off quickly and is succeeded by a gradual return to the normal.

A warm wet compress applied to the belly or back of an animal, has a contrary effect. It is immediately followed by a more or less energetic and persistent contraction of the arteries and veins in the pia mater, in which the pulsations become at the same time more frequent but less plainly marked. The respirations generally become quicker, but shallower. As the warm compress cools, dilatation appears, which can be still further increased by the subsequent application of a cold compress. Dilatation also occurs immediately after the removal of the warm compress, but continues for only a short time. If the compress be very hot it generally produces dilatation of the vessels, along with slower pulsation of the arteries. Plunge-baths have a far more powerful effect on the vessels of the pia mater than compresses. On the application of a cold bath, the dilatation of the vessels increases in proportion as the animal's body is dipped into the water. At the same time, the movements of the brain become slower but greater. It is only after a long stay in cold water that contraction of the vessels, often preceded by variations in calibre, and sinking in of the brain occur in consequence of the blood being much cooled down. The vessels of the ear, also, if the ears have not been submerged, generally dilate and the subsequent contraction appears in them much earlier than in the vessels of the pia mater, when the animal is left long in water. After the experiment is ended the vessels of the pia mater again contract, and often remain so for half an hour. A full warm bath always produces powerful

contraction of the vessels of the pia mater, and falling in of the brain, often preceded by a transient dilatation and contraction of the vessels. The movements of the brain, like the pulse, are at first quickened, but after some time become slower and shallower, and, lastly, become quicker as warmth increases, and after the bath. The short dilatation which succeeds a full warm bath is much more powerful if cold water be applied immediately after. Finally, even after a warm bath, the vessels of the pia mater become somewhat contracted before they return to the normal condition. A very hot full bath produces a dilatation lasting somewhat longer, and only causes contraction after the water has been cooled down to about 30° C. Schüller tried also the action of wet packing, with the following result. Immediately after trephining, the animal was rolled in cloth saturated with warm water at 27° R., over which a piece of wax cloth and a woollen wrapper were rolled, and the whole was tied up with a bandage, so that only the head remained free. The animals were then placed upon the table, with the head somewhat raised, and then observed sometimes for two or three hours. In this experiment the temperature sinks about one or two degrees Centigrade, and only begins to rise again after two hours and a quarter. The respiration becomes gradually slower and deeper, the pulse becomes slower, the animals react more slowly and less energetically to stimuli, and appear to sleep until after the temperature begins to rise again, *i.e.*, after two and a half to three hours, when they again become more lively, and lick their lips. The vessels of the brain present the following conditions. After a very transitory dilatation, they contract gradually and constantly; the brain falls in more and more, and at the same time the dura mater becomes raised by the cerebro-spinal fluid, which accumulates abundantly beneath it. The movements of the brain become slower and much more regular. These appearances remain for hours. External stimuli, such as pinching or raising up the animal, at first produce quicker and stronger movements of the brain, and greater and more varying filling of the vessels. At first these phenomena follow the stimuli almost immediately, but afterwards they are produced with greater difficulty. Animals which are rolled in dry cloths do not present these phenomena. After removing the cold pack,

a great dilatation of the vessels occurs, but they quickly return to the normal. The respirations and movements of the brain again become more rapid. Rubbing the belly or back with a cold or warm wet cloth, is always accompanied by a more or less powerful contraction or by alterations in calibre of the vessels of the pia mater. After the friction has ceased, a great but very transient dilatation appears. Friction with a dry cloth has the same effect upon the vessels of the pia mater, but to a less extent. A cold douche applied to the belly or back produces slow and extensive rising and sinking of the brain in consequence of the increased strength of the respiratory movements. These are at first irregular, and afterwards regular. Alterations in the filling of the vessels, and alternate dilatation and contraction of them, is observed. On the whole, however, the calibre alters within very narrow limits. After the proceeding is over, more or less marked dilatation, with protrusion of the brain, is noticed. Warm douches have a similar effect upon the brain vessels. After a warm douche the vessels are generally dilated for a moment, and then become contracted. Injections of cold water into the rectum always cause a moderate dilatation of the vessels of the pia mater.

If we keep in view that cold in general produces contraction, and warmth, dilatation of the vessels at the moment of application, all the facts observed by Schüller, after thermal applications, will appear to us *a priori* conceivable, so far as the circulation of the blood depends upon hydraulic laws alone.

But there is still another way in which we can show in the most striking manner on a living man that contraction or dilatation of the vessels in one part of the body is accompanied or followed by an opposite condition of the vessels in another part. It is in this way that the capacity of the entire vascular system remains the same, through compensatory alterations in the lumen of the vessels which compose it. The following facts demonstrate how sensitive is this arrangement for the regulation of pressure in the vessels of the body. In order to prove that the contraction of a large vascular area produced by temperature, causes a compensatory dilatation of the vessels in other parts of the body, I employ an instrument, constructed on the same principle as Fick's boot sphygmograph,

and which is identical in principle with the plethysmograph described and improved by Mosso. The apparatus consists of a cylinder of glass, sufficiently long and wide to receive a part of the human body, such as an arm. The end of this cylinder is either encircled by an india-rubber collar or closed by an india-rubber membrane, in which is a circular opening large enough to admit the hand and arm of the observer into the apparatus. The collar, or the edges of the membrane rest tightly upon the surface of the arm, but without interfering with the circulation in it. The cylinder itself has several openings, for the purpose

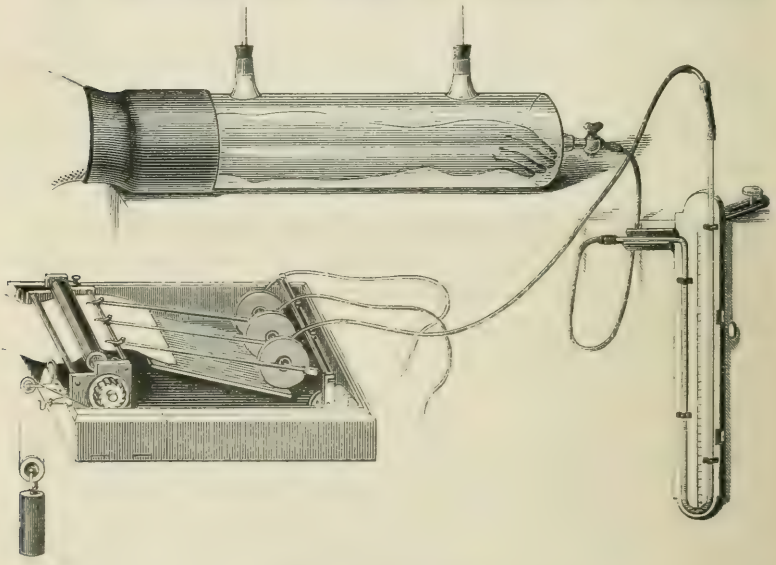


Fig. 1.—Plethysmograph.

of filling it with water, so as to expel the air completely after the arm has been introduced. One of these openings at the side or end is connected with a manometer connected with an india-rubber tube. As soon as the instrument is filled with water, and the air completely expelled, the openings are hermetically stopped. If the stopcock connecting the cylinder and manometer be now opened, oscillations of the fluid in the manometer are observed, and may be recorded upon a revolving cylinder by means of a floating pen, or by one of Marey's levers, as in the apparatus figured. Two sorts of oscillations

are observed in the tracing given by this instrument, besides the rise and fall of the curve indicating variations in the size of the arm. The larger oscillations coincide with the movements of respiration and the smaller with those of the pulse.

In the present experiment a man sat down naked in an empty sitz bath, and was covered on all sides with a blanket, the left arm being placed in the plethysmograph. The apparatus and manometer were filled with water about the ordinary temperature of the body, and connected with the recording apparatus. After the ordinary variations in volume of the arm had been recorded for some time, the sitz bath was very quickly filled with water at 50° F. The individual experimented on sat quite still, but the influence of the cold at the moment the water was poured into the bath caused alterations in the respiration and pulse. The curve showing the volume of the arm was registered during the whole time, without a break. The first

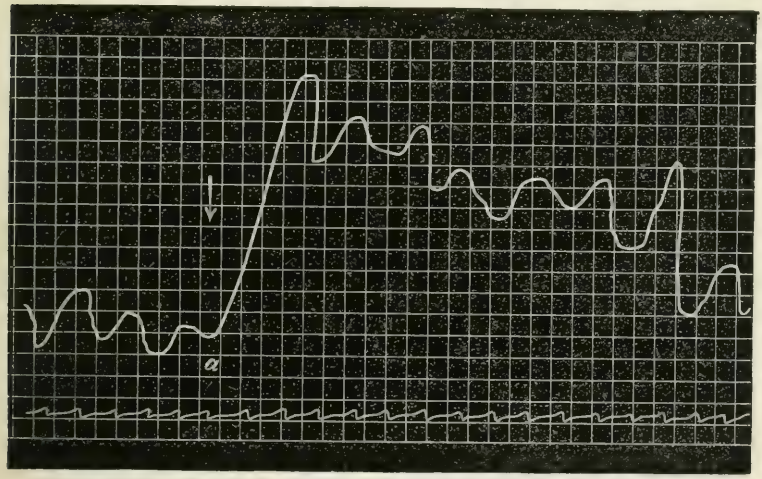


FIG. 2.—The curve shows the variations in volume of a man's arm during a cold sitz bath. The lower tracing indicates the time, each mark in it corresponding to two seconds.

part of this curve shows that so long as the individual sat in an empty sitz bath the volume of the arm remained nearly the same. The summits of the waves, corresponding to the end of expiration, lie nearly in one plane, as do also the lowest points

between them, corresponding to the end of inspiration. The small oscillations indicate the alterations in volume due to the pulse. At (*a*) cold water was poured into the bath. At the same moment the curve rose almost perpendicularly. The volume of the arm must therefore at this time have greatly increased, so as to drive water from the cylinder into the manometer and produce this rapid rise of the curve. The arm retained this increased volume for about eighteen to twenty seconds; in the next twenty or thirty seconds it diminished, but only very slightly. After this time it began to grow less, but without ever returning to its original size. This extraordinary alteration in the volume of the arm at the instant in which the cold water came in contact with the part of the body in the sitz bath can only be explained thus: the irritation of the cold stimulated the vaso-motor nerves which are reflexly connected with the sensory nerves of those parts. This stimulation caused a contraction of the vessels in a district of great capacity, the blood was either driven out of them or its access to them was arrested. In consequence of this a greater amount of blood was necessarily directed to other vascular areas. The parts to which the increased supply of blood was directed therefore necessarily increased in volume. We were able to observe an increased volume of the arm during the cold sitz bath, but the supply of blood is also increased in the thoracic organs and in the brain, as other effects of sitz baths indicate. On these grounds we are forced to the conclusion that it is especially the vessels of the abdominal organs which are caused to contract by the cold sitz bath, and that it is to these organs especially that the access of blood is diminished, and that it is out of them that the blood is expelled. The experimental proof of such an action of sitz baths can only be afforded by means of the volumometer, and I believe I am the first actually to adduce this proof. The counter experiment almost always succeeds with equal exactitude, and lends to our conclusion still greater weight. Under the same conditions as the experiment already described a curve was taken from the right arm of a young man sitting in the empty sitz bath. At *a* (Fig. 3) warm water at 111° F. was suddenly poured into the bath. At the moment it was poured in, the curve shows an increase of the volume of

the arm, lasting for about five seconds. After this the volume of the arm sinks for about fourteen seconds, and then remains at its reduced size for a considerable time. The first impression of warmth has here, as in Schüller's experiments, produced a temporary contraction of the vessels affected by it. This tem-

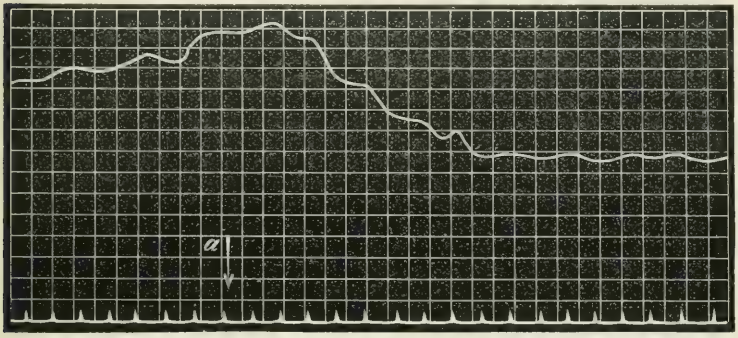


FIG. 3.—The curve shows the variations in volume of a man's arm during a warm sitz bath. The time curve below it shows intervals of two seconds.

porary contraction of the vessels must have been quickly followed by dilatation, produced by the relaxing influence of the warmth of the water in the bath. The consequence of this dilatation of a large vascular area must necessarily be increased flow of blood to it. This greater demand of the one part can only be compensated by diminished flow to other parts of the body. This alteration in the distribution of the blood appears in the diminished volume of the arm experimented on. We have thus an example of an actual derivation of blood from definite parts of the body, exactly as the previous experiment showed an increase of blood in one part of the body by its expulsion from another.

But theories alone will not cure patients, I think I hear my readers exclaim, and I will now proceed to show how the discoveries reached by means of the striking and ingenious experiments of various observers may be most effectually applied in practice, and will now describe the method of application, and the results of the derivative hydropathic method, of which I have already given the physiological basis.

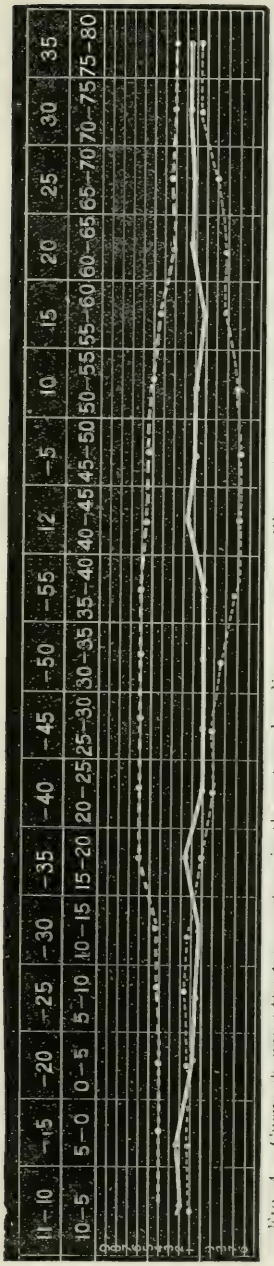


FIG. 4.—Curve showing the temperature in the external auditory meatus, axilla, and rectum before and after the application of wet compresses to the calves of the legs.

I will begin with the use of compresses for the calves of the legs. After a young man had lain for two hours on a bed naked, but covered with a blanket, a thermometer was introduced into the auditory meatus, another was placed in the axilla, and a third in the rectum. After the thermometers had indicated a constant temperature for some time, compresses were placed on the legs, reaching from the foot to the knee, and the temperature in the three thermometers was then observed. Its course is indicated by the curves in the diagram, and we will proceed to analyse the variations of temperature in these three parts of the body. The person experimented on was allowed to lie so long before the observations were commenced, in order to show that the horizontal position was not the cause of the alterations in temperature. The compresses were not applied until an hour and a quarter after the thermometers had been placed in position, and for an entire hour the height of the mercury in them hardly varied at all. The leg compresses consist of a piece of towelling about a yard long; a third of this is dipped in perfectly cold water and well wrung out. The whole bandage is now firmly rolled together, beginning with the dry end, to which tapes

are attached, and it is then evenly applied round both legs, and fastened in its place by the tape. Both legs are thus covered by a layer of wet linen reaching about twice round them, and which is surrounded by a triple layer of dry linen. The moist part of this bandage quickly acquires the temperature of the body, and the triple dry layer hinders loss of heat from the surface, so that the whole compress is quickly brought nearly to the temperature of the blood. This can be still further hastened by casing the whole compress with waterproof material, such as gutta-percha tissue. The moist warm vapour acts upon the nerves and vessels of the skin, producing, as we have already described, dilatation of those vessels, and, as I have also shown by the plethysmograph, greater capacity of the vascular system and acceleration of the circulation in the leg; the very conditions which we have enumerated as essential to the contraction of vessels in the other vascular areas of the body. The increased capacity and more active circulation in the vessels of the skin of both legs must needs be compensated by diminished capacity in another vascular district, for the contents of the vascular system are so exactly balanced that, as Mosso has shown, the equilibrium may be disturbed even by thought.[1]

But however this may be, we had learned the practical results before we seemed to have any chance of a possible explanation. Leg-compresses have long been used with great effect in cerebral congestion, headache, and affections of the brain: in all those cases in fact where the therapeutic indication is to lessen the quantity of blood in the head, or, as we should now say on the ground of our experiments, to derive blood from the head. It was in order to show this that the thermometer was placed in

[1] On one occasion a classical scholar spoke somewhat contemptuously to Mosso of his plethysmograph, and Mosso said that by it he could tell whether the scholar could read Greek as easily as he did Latin. The scholar was incredulous, but his arm was put into the apparatus, and a Latin book was handed to him to read. While perusing the book the curve sank very slightly. The Latin book was then taken away, and a Greek one given to him instead. The curve immediately became much deeper, showing that more blood had gone to the brain in order to maintain the greater mental exertion required for the reading of the Greek, and disproving the scholar's statement that he could read the one as easily as the other.—Gaskell, *Science Conferences, Biology*, &c., p. 108, *vide* also Mosso, *Movimenti dei Vasi Sanguigni*, p. 25.

the external auditory meatus. If we produce a fall of temperature in this part of the body, we may legitimately infer that we have caused a diminution of blood in the head, the result which we wished to attain by our application. On looking at the diagram, we see that the temperature in the external auditory meatus, before the application of the compress, was constant. It was only at the end of fifteen minutes, when the compresses began to get warm, that the temperature in the ear began gradually to sink, and continued to do so for fifty-five minutes, when the minimum was reached. At this point it remained for forty-five minutes, and then rose so gradually that even after eighty minutes the original temperature was not attained. The fall of temperature was as much as 0·4° C. A similar condition was observed in the axilla, but here the maximum fall was only 0·2° C., and the temperature began to rise again much more quickly than in the ear. The temperature of the rectum showed a curve almost exactly opposite. It began to rise almost at the same time that the temperature in the ear began to fall. It rose gradually 0·2° C., remained at this height for some time, and finally fell to 0·1° below the original temperature. We also see that a marked alteration, which can be previously determined, of the distribution of warmth in the body, follows on such an insignificant proceeding as the application of a so-called stimulating poultice to a circumscribed spot on the surface.

Instead of the leg compresses, one or two pairs of wet stockings may be put on, and well covered with dry bandages, and when we wish to produce greater derivation, and increase the district into which the blood may be diverted, we may cover the whole of the under extremities with such compresses, or vapour poultices, as they may be called.

In my next paper I will give several examples to show that these applications are amongst the most quieting measures which can be used for nervous excitement, for the most varied symptoms of irritation of the brain, for all the appearances of congestion of the head, such as muscular restlessness, twitchings in the upper extremities, picking of the bed-clothes, headache, sleeplessness, and even furious delirium.

THE ETIOLOGY AND TREATMENT OF OCCIPITAL HEADACHE.

BY EDWARD WOAKES, M.D. LOND.,

Surgeon to the Hospital for Diseases of the Throat and Chest.

In the first week of February, 1878, Mr. ——, a solicitor, aged forty-five, while seated in his office, became quite suddenly the subject of the following condition. He first experienced a sense of powerlessness in his arms, which hung down in a useless way at his sides. They were not paralysed, as he could move them quite freely on making an effort to do so. Severe pain in the back of the head followed very quickly, inducing him to rub the occiput violently with his hands in search of relief. Then running at the eyes and nose set in, and his hands became blue and cold. There was great præcordial distress, accompanied with flatulence and eructation, culminating in about an hour from the commencement of the attack in vomiting. This, however, did not relieve his other symptoms, though he threw up from his stomach his breakfast and about two teaspoonfuls of cod-liver oil which he had latterly been taking in the morning on account of the weak state of his health. In about two hours he was removed to his home and put to bed, all the symptoms except the vomiting continued, and to them were shortly added pains in the lower part of the back, the thighs, and calves of the legs, the most distressing symptom being the occipital headache.

Mr. —— had been a sufferer from migraine for many years. He was exceedingly emaciated and weak, with a sallow, attenuated countenance. He attributed his present state of health

partly to an attack of ague contracted when a boy in Lincolnshire, and which was followed by chronic indigestion with enlargement of the spleen, though the latter condition had of late years disappeared. His father died at the age of forty-two of serous apoplexy, his mother lived to her eighty-first year. There were six or seven in the family, several of whom suffered from some form of mental neurosis; a state of things which he attributed to the aldermanic proclivities of his paternal relatives for several generations back, a relationship of cause to effect which there is good ground to believe to be a true one.

It should be noted that throughout the attack there was no *vertigo*.

With the single exception of this last-named condition—vertigo—the symptoms just described bore a remarkable resemblance to those of mild poisoning by tobacco. (This patient never smoked, and was in all respects most abstemious.) These are increased flow of secretion from the eyes, nose, and mouth, with a feeling of tightness in the head as though a band were stretched round it, disturbance of vision, with tinnitus and vertigo. Palpitation and præcordial distress follow, and notably *aching and feebleness of the arms*. Then come nausea, eructation, vomiting, clammy sweats, voidance of the contents of the bowels, in fact a state of general collapse. If at any stage of the foregoing programme the subject of it should hold some iced water in his mouth, or better still chew and swallow small pieces of camphor, the symptoms will gradually pass off—camphor being the physiological antagonist of tobacco, to which fact we shall have further occasion to refer.

What is the import of these symptoms, so similar as to be almost identical, coming on in the one instance idiopathically—in the other as the result of taking a poisonous dose of tobacco? The answer to this query involves some points of extreme interest and importance to the practical physician.

The inquiries conducted by the writer into the subject of giddiness and noises in the head [1] have led him to refer most of the symptoms mentioned above to interference with the vaso-motor nerves contributed by the inferior cervical ganglion. The important relations of this vaso-motor subcentre not only in the

[1] *Vide Lancet*, February 9, 1878.

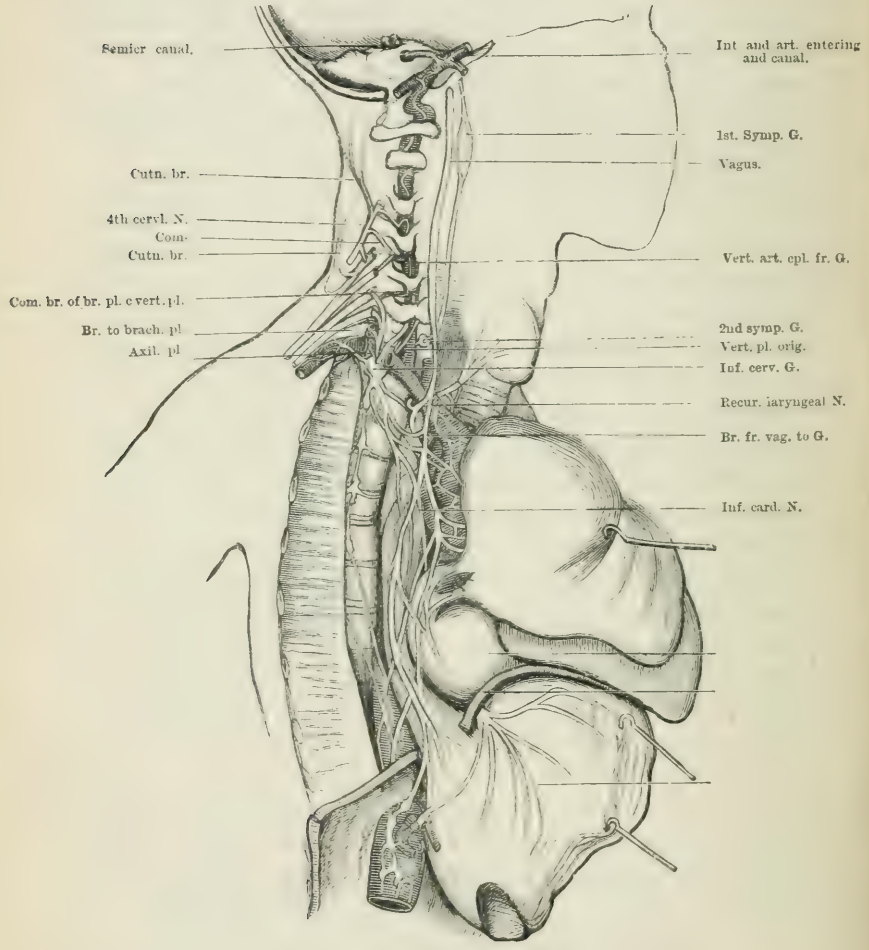
production of the symptoms just mentioned, but also as the medium for associating the stomach with the labyrinth in the production of vertigo originating in this viscus have been fully discussed elsewhere.[1] The area of interest attaching to this ganglion will now be seen to possess a still wider scope from its direct influence in the causation of occipital headache. Such being the case, we shall with the aid of the accompanying diagram briefly recapitulate the principal anatomical and physiological relations of this organ.

On referring to the sketch it will be seen that the inferior cervical ganglion (inf. cerv. G., *vide* diagram) is situated deeply behind the subclavian artery, very near the spot where the vertebral art. leaves it to enter the bony sheath constituted by the juxtaposition of the foramina in the transverse processes of the cervical vertebræ. Entering this canal with the artery are two or more cords from the ganglion (vert. pl. orig.), which form the dense vertebral plexus observed ramifying upon the artery of this name, throughout its course. As this vertebral plexus ascends with the vessel it transmits outwards some communicating branches (com. com.), which join the two upper trunks of the brachial plexus, and the lowest trunk (4th cervl.) of the cervical plexus of spinal nerves. The ganglion will be seen also to contribute a network of branches (axil. pl.) to the subclavian, destined to accompany the brachial artery throughout its ramifications. Looking now to the vagus nerve, a branch will be seen to proceed from it (br. fr. vag. to gangl.) to the ganglion from the point where the recurrent laryngeal nerve leaves the trunk of the vagus.

Bearing in mind that vaso-motor nerves when associated with cerebro-spinal nerves pursue for the most part an opposite course to the latter, it will be obvious that this communicating branch comes *from* the stomach to the ganglion. The branch in question is an important factor in the production of the symptoms in the case under review, on account of the connection it establishes between the stomach and the inferior cervical ganglion. It thus constitutes the medium by which is established the correlation existing between this viscus and the extensive areas supplied by the vertebral and brachial arteries, whose innervation

[1] *Vide British Medical Journal*, March 16, 1878.

has already been shown to be mediated by this ganglion. There are probably other cords of communication between the vagus and the ganglion, but it will simplify the description to note



only this one. One other important branch proceeding from this ganglion is the inferior cardiac nerve (inf. card. n.). As, however, its function was not prominently disturbed in the case before us, it may be dismissed from the present discussion.

There is very positive proof that nerves entering a ganglion communicate with the intrinsic caudate cells of the organ, by

which means they are brought into communication with one another. There is also satisfactory evidence to show that the sympathetic ganglia enact the part of secondary vaso-motor centres, receiving and reflecting impressions quite independently of the general centre: also, that they constitute correlating organs by means of which afferent impressions from distant regions are reflexly transferred in them to a totally different tract; the afferent impressions being manifested through their medium as efferent vaso-motor impulses in the area to which they are thus reflected. The sympathetic ganglia may thus be regarded as so many stations situated on the lines traversed by vaso-motor impressions, in which the points are managed, and by means of which impulses are transferred from one line to another. In this way, widely separated tissue tracts are brought into mutual relationship: a relationship so cordial that it is impossible for any one of them to experience any change in the normal state of tone or vessel equilibrium, without a corresponding change being *ipso facto* set on foot in the vascular supply of one or more of those remotely situated regions with which the vaso-motor fibrillæ of a given ganglion connect it.

The recognition of this physiological fact will assist to render intelligible a number of very curious and obscure phenomena observable both in health and disease. We select the following as an illustration from the records of gunshot injuries of nerves made during the late American war. It was then observed that soldiers who received bullet wounds in the brachial plexus, whether in the arm, axilla, or neck, *immediately fell to the ground.* This occurrence was not observed in wounds of any other correspondingly non-vital part of the body. It was not due to loss of blood, because we are distinctly informed that it occurred when no large vessel was injured. What then is its meaning? A reference to the diagram (brs. to br. pl.) will show the inferior cervical ganglion to possess branches of communication with the two lower cords of the brachial plexus of nerves, and there are other channels of communication between the upper cords of this plexus and the vaso-motor nerves of the vertebral artery, also derived from the ganglion. Thus there exist direct lines for the interchange of impressions between the nerves of the arm and the remotest ramifications of the vertebral artery. A

small but important peripheral branch of the latter is seen entering the internal auditory canal to supply the semicircular canals (s. canals) and labyrinth generally. Now the explanation offered of the above described occurrence in the battle-field is drawn from this anatomical relationship. It is as follows:— The shock communicated by the contusion of the bullet is transferred in the ganglion to the plexus on the vertebral artery in the form of a vessel dilating impression to the ultimate branches of this artery. This means a sudden accession of blood to the labyrinth, with corresponding increase of pressure on the endolymph, or fluid contained in the semi-circular canals. Physiologically interpreted, this implies such an interference with the equilibrating apparatus as to cause the sufferer to fall suddenly to the ground.

It will be obvious from this point of view, that the inferior cervical ganglia occupy a very important position in the animal economy. Bearing in mind their anatomical relations, and also the teaching of the largely-encouraged vivisection experiment just detailed, we shall be in a better position to follow the clues thereby afforded in the elucidation of the symptoms of the patient whose case we are considering.

First, as to the exciting cause of his condition—an over-dose of cod-liver oil introduced into the exhausted stomach of an already de-vitalised subject. This preliminary state is a most important factor in the production of vaso-motor phenomena, because it prepares the patient to become their subject by inducing the necessary degree of susceptibility to impressions, which may be regarded as an extreme mobility of the vaso-motor centres. This cannot be better illustrated than by again referring to tobacco-poisoning. An individual who, in robust health, will smoke a great amount of tobacco without manifesting any appreciable effect from so doing, will, when enfeebled by any cause, experience a more or less degree of the symptoms referable to it from smoking a single pipe.

The irritation produced under these circumstances of general depression by the presence of an indigestible dose of the oil was conveyed, in the first instance, from the stomach to the inferior cervical ganglion through the channel indicated in the diagram (br. of vagus to gan.). This impression is then transferred

as a wave of vessel dilatation along the arterial trunks whose innervation is mediated by the ganglion. Tracing the effect of the concomitant afflux of blood in the *upper extremities*, our attention is arrested, first of all, by the sensation in them of lassitude and weariness in which they hung seemingly helpless by the side. The explanation of this phenomenon resides, we believe, in the fact of the nutrient vessels of the brachial nerves—vasi-nervorum—being amongst the first to appreciate the state of passive congestion brought about in the blood-supply of the limb; moreover, as these vessels ramify within the dense limiting sheath of the spinal nerves, their expansion must exert considerable pressure upon the sensitive fibres contained therein, a state of things quite calculated to produce the sensations in the arms experienced by the patient.

The symptom now under consideration has been much overlooked in determining the etiology of this class of disease. One may produce it at any time by smoking too freely, a statement which has been confirmed by the experience of observant medical men given to tobacco. Its occurrence has the crucial significance of associating the concurrent symptoms with the lower cervical ganglion. With its assistance, therefore, many obscure attacks, which would otherwise be referred to central brain mischief, may be imputed to functional derangement of a much less vital sub-centre, while the gravity of their meaning is proportionately lessened.

The congested appearance of the hands which shortly set in is directly referable to the same condition of the circulation. "The arteries in the area, being dilated, offer less resistance than before to the passage of blood, consequently more blood than usual passes through them, filling up the capillaries and distending the veins." (*A Text Book of Physiology*, by M. Foster, M.D., 2nd edit. p. 170.) This condition, as taking place in a region open to observation, is suggestive of the state of things which will ensue under similar circumstances of vessel dilatation, in areas not thus capable of inspection.

The next symptom in the order of their occurrence was pain at the back of the head—*occipital headache*—accompanied with a feeling of weight and distress which obliged the patient to rub the occiput vigorously with his hands. This was really the most

important symptom throughout the case. It was due to the extension from the ganglion of the vessel dilating impression (originating in the stomach) to the vertebral artery, which forthwith became the carrier of an excess of blood to the medulla oblongata and other centres at the base of the brain to which this vessel and its branches are distributed. The absence of giddiness throughout the case is remarkable, for, as already intimated, the labyrinth, through the medium of the internal auditory artery, is the first organ usually to appreciate the existence of this passive arterial congestion, the pressure on the endolymph which it occasions being the direct cause of vertigo in lesions of the stomach. That this organ did participate, to some extent, in the dilated state of the vertebral circulation was shown during the early stage of the patient's convalescence. During this time his hearing became changed; he was not deaf, but every sound was heard as though muffled. It is possible, also, that the intensity of the pain in the head absorbed all the patient's attention, so that the minor annoyance of giddiness, if present, was unnoticed by him. Throughout the illness, however, he experienced that extreme nervous depression, anxiety, and sense of impending evil which characterise labyrinthine disturbances generally.

Lachrymation and *rhinorrhœa* followed, and marked a fresh stage in the condition, viz., the extension of the vessel dilating influence *ascensively* to the higher cervical ganglia—through their connecting cords with the lower one—and so to the vessel area of the branches of the carotids, most of which receive their nervi-vasorum from the first ganglion. This dilatation, taking place on a free mucous surface, was speedily relieved by a flow of secretion, and the impulse being a derived one, and not originating in these ganglia, soon passed off with the relief thus afforded.

The *palpitation* and *præcordial distress* shortly experienced by the patient were to some extent referable to implication of the inferior cardiac nerve in the disturbance of the ganglionic function. The flatulence and vomiting had reference, first of all, to the initial cause of the attack, indigestion. Though, doubtless, the long continuance of these symptoms, coupled with the prostration and imperfect action of the heart, indicate the descensive

propagation of the original vaso-dilator impulse to the splanchnic nerves, and the diminution of arterial tension consequent on these conditions.

Having thus hastily skimmed the *rationale* of this patient's condition as viewed from a vaso-motor aspect, necessarily compelling many omissions, we have to consider the indications for treatment which it affords.

He had been ill nearly a week before I saw him, and had taken bromide of potassium, soda, ammonia, and bark. At this time he suffered chiefly from the occipital headache, accompanied with mental distress and depression. His heart's action was variable, though feeble. The bowels were sluggish, with extreme uneasiness in the anus, which was spasmodically contracted; the pain from it extended up the sacrum; also what he described as rheumatic pains in the hamstring muscles and in the calves of the legs.

To relieve this headache (a sinapism to the nape having previously failed to afford ease) he was now painted with a concentrated solution of camphor in spirit behind the ears and downwards on either side the spine to the level of the shoulders. This gave him great and almost immediate ease, his mind became composed, and he felt inclined to sleep naturally, which hitherto had not been the case. Valerian was added to his bromide; the diet consisted of mutton tea with still dry champagne.

The headache returned to a less degree in a few hours. The camphor solution was applied as previously with the same marked relief to the pain, which from this time forwards did not return. The spasmodic condition of the sphincter ani was removed by a digital examination: with it the sacral pain ceased also, while the aching of the lower limbs gradually disappeared. In the course of five weeks he was able to undertake a journey to the coast, where the change of scene and rest, combined with sea air, tended greatly to his recovery.

Setting aside the calming of the initial waves of disturbance proceeding from the stomach, implied by the restricted diet, there remain two points in the treatment for further examination. The first has reference to the internal administration of bromide of potassium. It will be apparent that its use in this case was indicated by a general consensus of experience con-

firming its applicability to many kinds of headache presumably of reflex origin. The prominent lesson which this case suggests, however, is that it appears to introduce an element of certainty into the therapeutic indications for giving the bromide for the relief of headache. That is to say, when the area of disturbance can be referred to the tissue tracts supplied by the vertebral artery, the bromide may be regarded as having a specific influence. Preference should, however, be given to the hydrobromic acid, for reasons more fully examined in the paper referred to.[1]

The second point has reference to the choice of camphor for external application. We have already insisted upon the analogy existing between the symptoms of this case and those which occur as the result of an overdose of tobacco. Now camphor has repeatedly been proved by the writer to be an antidote in the latter condition; there was *primâ facie* evidence therefore to justify its use in the present case, with the object of antagonising the waves of vessel-dilating influence passing through the ganglion, and so to restore the distended arteries to their normal state of equilibrium. This at any rate was the indication, but from the fact of the stomach being *hors de combat* it was necessary to select some other channel by means of which to accomplish it.

A reference to the diagram will show a tract of skin, mainly located over the posterior triangle of the neck, to which are distributed certain cutaneous nerves (cut. brs.) which are brought into relationship with the ganglion through the medium of the plexus on the vertebral artery. The connection is accomplished by means of some communicating branches which pass from the plexus on the vessel (com. brs. of br. pl. c. vert. pl.) to the lowest cervical and highest brachial cords, from which the cutaneous branches in question are derived. Bearing in mind that vaso-motor nerves associated with spinal nerves pursue a contrary course to the spinal nerves, it is evident that there is in these skin nerves a direct communication between the skin of the neck and the vaso-motor subcentre constituted by the inferior cervical ganglion. Upon this *correlated* area accordingly the concentrated solution of camphor was freely painted, with the satisfactory result already intimated.

[1] *Lancet*, op. cit.

THE PHYSIOLOGICAL ACTION OF ACONITE.

BY G. HUNTER MACKENZIE, M.D.

(*Continued from* p. 195.)

THE respiratory symptoms of profound aconitism resemble those produced by section of the vagi in possessing the following features :—

1. A diminution in the frequency of the respirations.

2. A prolongation of the expiratory act, depending partly on increased action of the diaphragm, and partly on the participation of the accessory muscles of respiration.

3. A pause at the end of expiration. (This is most characteristic of both conditions.)

4. All the characters of ordinary dyspnœa, with the exception that in ordinary dyspnœa, the frequency of the respiratory movement is increased, whilst after section of the vagi, and during profound aconitism, it is diminished.

5. An anæsthetic condition of the mucous membrane of the air-passages.

Experiments have shown that the peculiar respiration produced in animals by section of the vagi, is mainly due to paralysis of the sensory nerves ; for it is found that after section of the two recurrent laryngeal nerves, the effect on the respiration is very inconsiderable, and the retarding result of section of the nerves themselves was not materially affected by tracheotomy. This indicates that, after section of the vagi, it is not the motor but the sensory element in the reflex act of respiration that is interfered with, and a similar set of symptoms may therefore be produced by paralysis of the sensory fibres only. The existence of this paralysis during aconitism is indicated by the presence of the above features, and is confirmed by

the important fact that section of the vagi in an aconitised animal is not followed by any alteration in the character of the respiratory act, a result which could only be obtained on the supposition that the functions of the sensory branches of that nerve had been previously paralysed. Aconite may thus be regarded as acting on the sensory fibres of the vagus in a manner similar to its action on the spinal sensory nerves. By this paralysis the main sources of the reflex inspiratory act are completely abolished, and the transmission of the impression which normally originates in the lungs, and is conveyed by the afferent fibres of the vagus to the respiratory centres in the medulla oblongata, calling into action the rhythmical movements of respiration, becomes lost. The sense of the need of air is undoubtedly present in aconitised animals, but this appears to become gradually less as the aconitism deepens, and the vagi may subsequently be divided without markedly interfering with the course of the symptoms.[1] Whether the primary irritation present in the spinal sensory nerves also affects the sensory branches of the vagi, cannot positively be shown, for though this nerve has been found to be decidedly deficient to ordinary painful impressions, it is susceptible to a peculiar kind of irritation, and to this may be due the (reflex) spasmodic cough and hiccough, which form early prominent features of aconitism. Whilst aconite thus induces a variety of symptoms closely resembling those that may be artificially produced by section of the vagus, and which may therefore be regarded as due to paralysis of the sensory branches of that nerve, it appears also to have a direct primary action on the respiratory centre, which Legallois has shown by his experiments to be in close relation with the nucleus and roots of the pneumogastric. These roots are entirely sensory, for, according to the experiments of Longet, it is only after having received the inosculating fibres of the spinal accessory, facial, hypoglossal, and the two upper cervical nerves, that the vagus has been found to contain motor fibres. It seems probable, therefore, that as in the case of the spinal nerves, the sensory paralysis is not purely peripheral, but extends along the course of the nerve to the nerve root, and implicates the respira-

[1] Böhm and Wartmann obtained the same result on section of the vagi in an aconitised animal.

tory centre. The existence of this centric paralysis is believed in by Böhm and Wartmann, as also by Wood. With regard to the condition of the motor branches of the vagus during aconitism, it is certain that their condition is not one of paralysis, for during the present series of experiments it was found that their electrical irritation invariably induced free contraction of the muscles supplied by them, and the inefficiency of tracheotomy in mitigating the respiratory embarrassment indicates that this condition is not due to obstruction at the glottis from laryngeal spasm or paralysis. The intermittent convulsions developed during profound aconitism are evidently not wholly respiratory, or due to defective aëration of the blood, for they occurred in an aconitised animal with divided vagi, are inspiratory, and are present in the pithed frog. Their causation appears to be of a complex nature, being partly respiratory, partly voluntary, and due to the violent exertions on the part of the animal to breathe ; and, as has been shown in the case of frogs, partly owing to increased irritability of the muscles, motor nerves, and motor columns of the cord. Their absence during aconitism in an animal deeply chloralised appears to indicate that the development of the abnormal motor irritability may be prevented by the free use of the hydrate of chloral.

The physiological action of Aconite on the respiratory system may thus be summarised :—

1. Its effect on the respiration is primary, and due to the direct action of the drug on the sensory fibres of the vagus, and the respiratory centre.

2. It induces a series of symptoms closely resembling those developed after section of the vagi.

3. It causes death partly by asphyxia, and partly by the variety of collapse spoken of by Brown-Sèquard as "characterised by a great diminution of breathing, produced by a peculiar influence on the central organs of respiration, the heart continuing to beat with more or less vigour."

(*To be continued.*)

ON OXALATE OF CERIUM IN CHRONIC COUGH.

BY THOMAS CLARK, L.R.C.P. AND S.E.

I HAVE for some time used the oxalate of cerium in cases of chronic cough with shortness of breathing, with very marked success.

One case under observation is a proof of its good effects as a sedative.

A lady has suffered for some years with cough and difficulty of breathing, on the least exertion "the outcome of an acute attack of pneumonia," the cough being most troublesome in the morning on getting up; so bad as to cause sickness. I prescribed 5 gr. half-an-hour before rising.

The physical signs observed in her case have been loud bronchial breathing, with great abdominal action, impaired resonance over lungs, with a slight dulness at the apex of left lung. The most marked physical changes since taking the ox. cerium, are less noise in breathing, less abdominal action, no cough in the morning, and increased strength.

I could relate other cases, but will only mention one other, it being under my care in our village hospital: a case of consolidation of the right lung. The rest given to the lung by the ox. cerium in gr. 5 doses is observable in the comfort in breathing and the cessation of cough for twenty-four hours after each dose.

The medicinal properties of ox. cerium I believe to be purely sedative, a great desideratum in the treatment of lung diseases, the difficulty being to find a drug that will not upset the digestive organs. In all cases wherein I have used the ox. cerium the only symptom observable from its use is a slight dryness of mouth.

Reviews.

Headaches: their Nature, Causes and Treatment. By W. H. Day, M.D., Physician to the Samaritan Hospital. 2nd Edition. London: J. and A. Churchill.

The first edition of this little work came out last year, and the appearance of a second edition so soon is the best evidence we could have of its having found acceptance with the profession. Dr. Day does not go in for any very deep researches as to the nature of headaches, but gives us the impression of faithfully recording what he has seen himself, and how he has interpreted his experience. To some his divisions may seem rather fanciful, and too minute, as for instance separating "congestive headache" from the "headache of plethora and increased vascular action." But on the whole his divisions are to be commended. We have not space to criticise any portions of the work at length, but the chapter on Dyspeptic or Bilious Headache seems a very good exposition of the present state of our knowledge on the subject. The chapter on Headaches in childhood and early life may be read with advantage. His remarks upon the headaches related to mental overstrain at school are sound and valuable. He describes the headache to which women are subject with much fidelity. A table of formulæ concludes the work, and among them are some very useful prescriptions. On the whole we should say that this is a useful though unpretending little work.

Clinic of the Month.

Turpentine in Typhoid Fever.—Dr. Perssé White, states, that some years ago he was led to try turpentine in a case of typhoid fever, which had run a course of twenty-eight days with moderate severity; the diarrhœa was not severe, and was kept in check by acetate of lead. On the twenty-ninth day of her illness, in fact, the first of her convalescence, terrible excitement came on; the cause could not be clearly ascertained. A leading physician of Dublin was called in, turpentine was prescribed, on the supposition that there was uræmic poisoning, urine being scanty, and convulsive movements of the facial muscles occurring. She went on from bad to worse, and died in three days. Dr. White refers to a series of cases which came under his care some years ago, in which typhoid fever was accompanied by bronchitis, and was often the forerunner of death. In these cases he was induced to try turpentine, in the form of the following mixture; ℞. Terebenthinæ Olei. ʒii; liq. potassæ ʒii; mucil. acaciæ ʒiv; syr. floris aurantii, vel. Syr. papav. alb. ℥i. Aquæ camphoræ ad ℥viii. M. ft. mist. One ounce to be taken every fourth hour. After commencing this treatment, he never lost any case of typhoid, from either bronchitis or diarrhœa, or their sequelæ of ulceration, or hæmorrhage. Each epidemic of typhoid—and at present he says there is a widespread and severe one passing over Ireland—is marked by its peculiar characters. The present one is characterised by intense pain in the abdomen, with enormous flatulent distension. In most cases, constipation exists before the illness is developed, and when removed by purgatives, diarrhœa sets in. He gives a case in which the turpentine treatment was commenced early and proved very successful. (*Medical Times and Gazette,* March 2, 1878.)

Thymol as an Antiseptic.—A new and important antiseptic has been discovered in thymol. It is stated that one part in 1,000 of a saccharine solution will prevent fermentation,

and it is an agreeably smelling substitute for carbolic acid, instead of which it can be employed. (*Idem.*)

Treatment of Urethral Fever.—Mr. Reg. Harrison, of Liverpool, refers to the fact, that not unfrequently within a few hours after the passage of a bougie, the patient experiences a sense of chilliness; this rigor is usually followed by more or less febrile excitement, which quickly subsides without causing the patient much inconvenience or distress; instances, however, occasionally occur when similar symptoms prove to be of the gravest character, and are speedily followed by death. He records a case that fell under his notice, when death followed the introduction of a bougie in six hours and a half. Such cases are no doubt due to shock, propagated by the sympathetic system, which largely supplies the generative organs. They rarely or never occur when anæsthetics have been used, thus suggesting that the consciousness of pain may be an important factor in their production. A practical deduction may be drawn, he suggests, from this, namely, that too large a bougie should not be forced into the bladder. Where he has reason to fear that a rigor will supervene after the introduction of an instrument, he invariably prescribes a two-minim dose of Fleming's tincture of aconite to be given immediately after the operation. This he has found almost unfailingly effective. On the occurrence of a rigor, he generally uses quinine in 5-10 grain doses, combining it with aconite, when there are early indications of febrile excitement. In the management of suppression of urine, which more or less attend the severer cases, our efforts, he considers, should be directed towards securing the elimination of the excreta, which the kidneys fail to do. This may be accomplished by acting on the skin with vapour baths, or what is almost equally efficacious, by placing the patient in a hot bath, and then enveloping him in blankets. The infusion of digitalis, given frequently in teaspoonful doses, has been strongly recommended for its action on the kidneys when stimulating diuretics would be out of place. (*Lancet*, March 16, 1878.)

Treatment of Transverse Fracture of the Patella.—At a late meeting of the Clinical Society, the President, Mr. George W. Callender, brought a patient fitted with an apparatus which he had employed for some time past at St. Bartholomew's Hospital. It consisted essentially of a sheet of plaster fitting to the thigh, and extending to the upper margin of the patella, with loops on either side of that bone, and of a canvas slipper between which, acting from the sole of the foot and the loops in the plaster, such extension was made by means of pulleys as suffices to draw the upper fragment down to the lower portion of the broken bone. It was easy to regu-

late the tension, and when it was thought well for the patient to get up, the apparatus was left on, as it acted just as well when the man was walking about as it did whilst he was recumbent in bed. Practically, the appliance had been found to insure very good results. (*Medical Times and Gazette*, March 2, 1878.)

New Mode of Treating Varicocele.—Mr. S. Messenger Bradley states that he finds the following simple procedure an efficient method of treating varicocele. Pass a long and strong hare-lip pin between the veins and scrotal walls, bringing the point of the pin close beneath, but not through the scrotum; then make the point retrace its course, but passing now behind the veins until it emerges near the puncture through which it entered. In a word, by employing that form of acupressure, known in the Aberdeen School as the method of retroclusion. (*British Medical Journal*, March 16, 1878.)

Treatment of Obstruction of the Bowels.—An important caution in the use of the O'Beirne tube, in the treatment of obstruction of the bowels, is given by Dr. Nairne of Glasgow. He remarks that amongst the means employed for affording relief in obstruction of the bowels, are ranked a long flexible tube (O'Beirne's) and rectal bougies. He thinks they rarely fulfil the indication for which they are employed, whilst in certain conditions, as in stricture, their use may be followed by the most serious consequences, both in the hands of the experienced and the inexperienced. When a stricture occurs embracing the free surface of the bowel it is quite an impossibility to pass a tube through the stricture; the bowel is certain to be ruptured. He has lately had under his care four cases of obstruction of the bowels. In two of them the tube was used. In neither case was any relief obtained. In the last one *post mortem* examination disclosed the fact that the bowel had been punctured below the stricture. Experiment on the dead subject in which the presence of a stricture was imitated by the application of a ligature, led to the same conclusion as that which he had already arrived at. The point of the tube did not touch the stricture, but travelling along the free border of the bowel impinged at a point on the superior and slightly anterior surface, perpendicular to the stricture and carried that part of the bowel over with it. The tube being moved up and down a few times as if searching for the centre of the stricture, the external coat of the bowel gave way as a longitudinal split and hernia of the inner coats took place. Hardly any pressure was exercised. Hence Dr. Nairne is inclined to advocate that no tube or bougie longer than six inches should be passed into the bowel. (*Lancet*, March 16th.)

The Seton.—In the recently-published report of the United States Marine Hospital Service will be found a paper by Dr. Griffiths on the "Seton in Paralysis and Epilepsy." Of eighteen cases of hemiplegia treated in the Marine Hospital, Louisville, in one case only, that of a patient who died under treatment two months after admission, did the the seton fail to benefit. Of the other seventeen cases, ten recovered, and the rest were much relieved. Four out of five cases of epilepsy treated with the seton were greatly benefited. The author introduces a large seton fifteen to twenty strands of silk or flax thread, and allows it to remain for months if necessary, removing it only when the patient is either permanently improved, or too great irritation is reduced. Dr. Griffiths states that he has also used the seton with good results in the treatment of obstinate iritis. (*Lancet,* March 16th, 1878.)

Treatment of Bromide of Potassium Eruptions.—Dr. Russell, in a discussion which took place in January at the Pathological Society, states that he had as a patient a young woman aged twenty-two in the out-patient department at the Cumberland Infirmary, who was treated for epilepsy with drachm doses of bromide of potassium three times a day. As the fits persisted, although lessened in frequency, the dose was increased to eighty grains. Soon after this increase a pustular eruption appeared scattered generally over the body and extremities, of which the patient complained much. The bromide was stopped for a time and the eruption disappeared; but the increase in the frequency of the fits made it imperative to resume the remedy. This was done, and the larger dose given, and again the eruption appeared. Dr. Russell, remembering the fact that arsenic counteracts the physiological action of the iodine compounds, at least in a certain proportion of cases, ordered five minims of liquor arsenicalis to each dose of the bromide. Within a week, the eruption had gone and no fresh papules appeared. The eruption was first papular, then pustular. None of the pustules were smaller than a good sized dried pea, and the largest were double that size; there was a zone of inflammation round their bases. (*British Medical Journal,* March 16th, 1878.)

Compressed Oxygen as a Test of Cellular Potency. Professor Paul Bert, of Paris, has lately utilised a former discovery of his—that compressed oxygen destroys organised (cellular) ferments, as well as living cells in general; whereas it has no effect on chemical (liquid) ferments—to determine whether certain poisonous animal ferments owe their properties to the presence of cells or not. He found (*Comptes Rendus,* lxxxiv. p. 1130) that the poison of the scorpion, fresh, dried, or redis-

solved in water, resisted the action of compressed oxygen, and that vaccine lymph could be exposed for a week to oxygen at a pressure of fifty atmospheres without losing its peculiar influence. In the same way the virus of glanders, and that of malignant pustule, remain unaffected. Hence Bert concludes that all these poisons are independent of living cells, and that even if the corpuscular elements which their liquids contain appear, as Chauveau maintains, to be the seat of the fermentative material, this is only because the latter adheres to them by simple attraction just as, for example, hæmoglobin is retained by the blood corpuscles. (*Medical Times and Gazette,* November 3rd, 1877.)

Extracts from British and Foreign Journals.

A Simple Mode of Cleansing the Nasal and Pharyngo-nasal Passages. — Dr. Thomas Rumbold, of St. Louis, observes that the greater number of those patients who are afflicted with chronic catarrh of the nasal passages require in the early part of their treatment frequent cleansing of those cavities, and in the periods between the visits of the physician this proceeding may safely be intrusted to their own care. The simplest mode of performing the ablution of the passages in question is by means of inhaling water and air from the palm of the hand into the nostrils, and Dr. Rumbold gives the following directions, as well as some drawings of the parts showing the direction of the current. He uses solution of common salt in the proportion of a teaspoonful to a pint of warm water. During inspiration through the nostrils, he says, the course of the greatest volume of the stream of air that enters these cavities, is not parallel with the bridge of the nose, nor does it pass along the floor of the nasal passages, but nearly between these two boundaries, which course is generally at an angle of about 45° with the plane of the forehead. If we keep in mind that the tendency of the stream of inhaled liquid is to take the same direction that the air does, and that the water, because it is heavier than the air, will deviate from this course by gravitation, we have only to place the head in certain positions to be enabled to wash or bathe the entire surface of these triangular-shaped cavities, except the inferior portions of the turbinated processes. To reach the anterior third of the nasal cavities the head of the patient should be inclined forward to such an extent that the plane of the forehead will be nearly in a horizontal position; then the stream inhaled from the hand will go upward and forward at an angle of 45°. In this position of the head, gravitation causes a part of the inhaled solution to fall on the most anterior portion of the passages. After the inhalation of one or two handfuls, the patient should blow the nose, to free it of all liquid and loosened secretions. Continued and hard blowing of the nose should, however, be avoided, as this is liable

to force mucus up the Eustachian tubes, as well as to aggravate the congestion of the inflamed mucous membrane. To wash the middle third of the nasal passages, the head should be inclined forward until the forehead is placed at an angle of 45° with the horizon, then the greater part of the stream of inhaled air and liquid will enter the cavities in a vertical direction, striking the superior portion of the cavity, but gravitation will divert a part of the fluid forward, and a part of it backward, of the vertical line. Again, the loosened secretions should be blown out. In the third position of the head the forehead should be placed in a vertical position, then the stream of air and fluid will enter the cavities at an angle of 45° with the horizon, going upward and backward. Gravitation, in this case, instead of causing it to fall forward, as it did in the first position, will cause a part of the solution to pass along the floor of the passages, thus washing the remaining third of the surfaces. Again, all liquids and loosened secretion should be blown out. In the first and second positions, the inhaled liquid will come out of the nostrils in front, but in the last position all of it will come out from the mouth. While the head is in the third position it is possible for the patient to inhale the solution with sufficient force to cause a part of it to strike the posterior wall of the pharyngo-nasal cavity; if so, the surface of this cavity, with that of the pharnyx and upper surface of the soft palate, will be washed also. In this way the patient can remove the tenacious mucus adhering to these surfaces, which removal cannot be accomplished by any other effort he can make, for the reason that the mass of accumulated secretion is located above the place reached by the movements of the tongue or soft palate, or the force of the breath in hacking or rasping the throat. Patients in their endeavour to remove this adhering mucus, usually have severe "coughing spells" in the morning, as they term their efforts to clear the throat, but these efforts do not rid the mucous surface of the offending matter; this removal is accomplished only when they continue to cough long enough to induce gagging efforts, which efforts are accompanied by a qualmish condition of the stomach, and a copious flow of free mucus; it is this fresh flow of liquid mucus that accomplishes the removal of the adhering mass by washing it away from its place of lodgment. The attempt to remove this tenacious secretion by the old gargling method must always fail, because this method cannot throw the liquid employed to the part desired, it can only wash the tonsils, the anterior surface of the soft palate, the base of the tongue, and a small and unimportant portion of the fauces. Those patients who cannot clear their throat with the first course of inhalation from the hand, and whose cough is continued so long by the presence of the lodged secretion that it

produces a gagging sensation, should lie down in bed for a few minutes, as the recumbent position will usually relieve this disagreeable symptom. After the sickness of the stomach has passed off, and the solution inhaled has loosened the adhering mass, they will be enabled to clear the throat by another course of inhalation. The number of times that these inhaling operations should be repeated is a matter of some importance. We must keep in mind that the nasal passages are not made to receive any kind of liquid, and that the lining membranes absorb to their injury more or less of every fluid that comes in contact with them. The reason why the medicated solution is a benefit, is, because it acts as a solvent to vitiated secretions that are far more deleterious to the mucous membranes, than the effect of the absorption of the liquid itself: it follows, therefore, that just so soon as the decomposed secretions are removed, the solution, if continued, will be a means of doing harm. After the surfaces have been made clean, the washing should be stopped, even though it produces a pleasing sensation, because the absorption of the water causes the membranes to become swollen, in which condition they are more susceptible to the deleterious influences of cold. If at any time the inhaled liquid produces a painful sensation, which lasts beyond one or two seconds, it should be discontinued, even if the passages are not entirely cleansed. With such cases, a few partial washings, aided by the local applications made by the physician, will decrease the heat of the parts, which is the cause of the hardening of the secretions; then the cleansing can be completed without producing the least disagreeable effect.

Patients in whose nostrils or throat dry masses collect, should inhale three handfuls of the solution immediately on getting out of bed in the morning, placing the head in the three positions named; this will soften the mass a little; by the time they have completed their toilet they will probably be able to cleanse the head by a second course, *i.e.* with three handfuls more. During the early treatment of a bad case three and four courses may be required in the forenoon. The solution to be inhaled from the hand, and composed, as above stated, of common table salt and water, should be a little warmer than blood-heat. Patients will soon learn from experience whether or not this is the proper strength or temperature, when they are informed that water either without salt or with too much in it is productive of more or less pain, and that the right quantity (which varies with different individuals), produces a pleasant, bland sensation; also that cold water causes a disagreeable as well as an injurious effect. For those cases whose nasal secretions are offensive, five grains of salicylic acid should be added to the pint of warm salt water. (*Chicago Med. Journal, Examiner,* May, 1877.)

Diagnosis and Treatment of Hæmorrhage from Rupture of the Cervix Uteri.—Dr. H. Fritsch observes that it is only recently that rupture of the cervix uteri has been recognised as the cause of profuse hæmorrhage after parturition, although many cases formerly reported are clearly referrible to this cause. Its occurrence may be suspected where there is constriction of the os, especially in shoulder and footling presentations with early rupture of the membranes, in early development of the head, sudden cessation of resistance with wide pelvis, discharge of fluid blood immediately after the birth of the child, continuance or return of the hæmorrhage when the uterus is well contracted. Dr. Fritsch states that in the cases he has seen he has always been successful in arresting the hæmorrhage by first mopping the wound with a twenty per cent. solution of liquor ferri perchloridi; then after twelve hours washing the parts over with a two per cent. solution of carbolic acid, and after the lapse of twelve hours removing all clots with the hand. After this ergotin was subcutaneously injected. In some instances Dr. Martin, the reporter, states hot water injections succeed well, or bimanual compression with plugging. (*Centralblatt für die Med. Wissenschaft.* No. 2, 1878.)

The Treatment of Carbunculus Benignus.—Clever states that in the case of a carbuncle nearly eight inches in diameter, with softened and sloughy central portion, occurring in the gluteal region of a woman, sixty years of age and of feeble constitution, he made eighteen injections of a two per cent. solution of carbolic acid. In the course of two days all febrile symptoms and pain subsided, after four days the infiltration disappeared, and the process of cicatrisation took place with unwonted rapidity, without any bad results from the action of the carbolic acid. (*St. Petersburgh Med. Wochenschrift*, 1877, No. 27.)

The Actual Cautery in Chronic Joint Disease.—C. Jaffé refers to the excellent results recently obtained in chronic diseases of the joints by Richet, Julliard, and Kocher from the employment of the actual cautery. The most convenient form of applying it, he considers to be the thermo-cautery of Paquelin, a strictly antiseptic method of treatment being subsequently adopted. He observes that with the aid of percussion of the bones it becomes in many instances possible to determine the precise seat of the most intense processes of inflammation, and that in cases of primary or secondary central osteitis, the seat of the disease may be attacked with the thermo-cautery, either with or without previous incision and removal of the affected part, and that thus further mischief may be averted and all danger of

secondary implication of the joint avoided. He gives a series of cases in which this plan of treatment was adopted with the best results. (*Inaug. Diss. Strassburg*, 1877, and *Centralblatt f. d. Chirurgie*, 4, 1878.)

Subcutaneous Injection of Chloroform in Neuralgia.—E. Besnier gives the results of his experiments on the effects of the hypodermic injection of chloroform. In one case of sciatica where many other means had been used without success, and where the injections of morphia had been requested to be discontinued by the patient himself on account of the distressing after effects, the injection of from ten to fifteen drops of chloroform gave immediate relief to the pain, which lasted for several hours. In other cases he has injected as much as twenty drops with equal success. He observes, however, that the injection requires to be practised with some care, and the fluid should only be allowed to penetrate the subcutaneous connective tissue in order that painful effects may be avoided. (*Bulletin Général de Thérapeutique*, B. xciii., 1877, No. 10.)

Belladonna as an Anti-galactogogue.—At a meeting of the Glasgow Medico-Chirurgical Society, Dr. Hugh Miller stated that he had adopted belladonna as a good agent for allaying irritation and preventing the secretion of milk. With a view to avoid friction and obtain the full therapeutic use of the agent, he had an alcoholic extract prepared of double the strength of the emplastrum belladonnæ, but kept fluid by collodion and with camphor added. The preparation was painted over the breast night and morning until the acute symptoms subsided. It was useful whether the inflammation accompanying the onset of the lacteal secretion had for its exciting cause exposure to cold, inflamed nipples, or obstruction in the lacteal ducts. The preparation was also used by applying it to both breasts every day, when the mother did not intend to suckle the child. The application in these cases was begun before the secretion of milk was established. (*London Medical Record*, Feb. 15th, 1878.)

Treatment of Asthma.—M. Sée, at a recent *séance* of the Académie de Médecine of Paris, read a paper on the treatment of asthma by means of potassium iodide and ethyl iodide. He stated that as long ago as 1860 Dr. Horace Green had discovered the presence of potassium iodide in a secret remedy for asthma. In 1868 Trousseau published his observations on the good results of this remedy, and shortly afterwards M. Sée turned his attention to the subject. In twenty-four cases he had been able to watch the results for a year, whilst in other instances he had followed up the cases for two, three, and four years, thus fulfilling the requirements of a good observation. Four of the cases were infants, six adolescents, ten adults, and four aged

persons. The first dose was 1·50 gr. (or about twenty-two grains), and this was gradually reduced to thirty and forty-five grains. The duration of the treatment was variable, but usually after the lapse of two or three weeks the attacks became less pronounced, and the dose was then lowered again to twenty-five grains per diem, now and then allowing a day to pass without any being given. The effects of the potassium iodide on the asthma and on the attacks are, that the respiration becomes free after from one to two hours, and if it can be administered some hours before the attack, this is almost certainly prevented from developing, whilst the subsequent attack is altogether suppressed. The symptoms improve, and in the course of time the orthopnœa and emphysema give place to a normal respiration, with more or less disseminated mucous *râles*. The effects of the iodide on chronic asthma with emphysema are not less remarkable. Inhalations of ethyl iodide (6–10 drops) six or eight times a day have also, in M. Sée's hands, given excellent results, stopping the attacks in a very remarkable manner. Ethyl iodide, like potassium iodide, has a very well-marked action on the bronchial secretion, augmenting its quantity and reducing its consistency, and thus facilitating the entry of air into the pulmonary alveoli. (*Archives Générales de Médecine*, Mars, 1878.)

Urari or Curara.—M. Jobert recently read a paper before the Académie des Sciences of Paris on the mode of preparation of a species of Urari that he had made at Calderaò, Brazil, not far distant from the Peruvian frontier. The elements of the preparation are:—1. The Urari uva, a climbing plant of the type of the Strychnias. 2. The Eko, or Pani, of Mahardo, a climbing plant, analagous to the Menispermaceæ. The accessories are:—3. The Taja, an Aroid. 4. The Eone, or Mucura ea ha, an Amarantaceous plant. 5. Three plants belonging to the order Piperaceæ. 6. The Tau-ma-gere, or Tongue of the Toucan. The author sends photographs, and intends to send specimens of the plants to Europe. The process of preparation is thus conducted. The barks (Nos. 1 and 2) are rasped and mingled in the proportion of four parts of the first to one of the second. This mixture is exhausted with cold water, which acquires a red colour. The water is then boiled on fragments of the stems of Nos. 3 and 4 for the space of six hours, till it has acquired a thick consistence. To this the raspings of the Piperaceæ are added, and the whole is again boiled. On cooling this fluid assumes a waxy consistence. (*Archives Gén. de Méd.*, March, 1878.)

Radical Cure of Hernia.—Schwalbe reports four cases of inguinal hernia in which he effected a radical cure by the subcutaneous injection of alcohol in the vicinity of the abdominal rings. In each case he injected one or two Pravaz syringefuls

of spirit, containing 70 per cent. of alcohol. The patient was placed in the recumbent position, with the knees drawn up, and the hernia having been completely reduced, the needle was thrust in near the neck of the tumour, and the contents of the syringe were slowly injected. The truss previously worn was immediately replaced. Several such injections were made in the form of a half-circle above Poupart's ligament. Schwalbe found that in the course of four months the parts had become so dense as to prevent the descent of the bowel, even during the most violent coughing. (*Deutsche Med. Wochenschrift*, 1877, No. 45.)

Treatment of Traumatic Tetanus with Chloral Hydrate.—A negro labourer, thirty-five years of age, of good but somewhat nervous temperament, wounded himself on the back of the left hand while hewing wood. The wound was not severe, and seemed to be progressing favourably, until, on the thirteenth day after the accident, the patient complained for the first time of painful cramps in the lower extremities. The muscles of the jaw were also evidently set, for he opened the mouth with considerable difficulty. The body likewise was bent forwards by contraction of the abdominal muscles. In a word it was plainly a case of incipient tetanus. Dr. Ferrini immediately ordered 4 grammes of chloral hydrate in 120 grammes of water; a teaspoonful at short intervals, until a decided tendency to sleep manifested itself. During the night the patient had several attacks of spasmodic action in the lower extremities; but the trismus had not increased; temperature 101°·3; pulse 80. To continue the chloral. During the next four days little change took place; but on the 6th June the patient had three severe paroxysms of tetanic convulsions, accompanied by trismus, which was nearly complete. Temperature 102°·3; pulse 102. Dr. Ferrini now added to the treatment an infusion of jaborandi (4 parts of the leaves to 250 water), to be taken every half-hour. This remedy acted very rapidly. In less than an hour after its exhibition the patient became bathed in sweat, and copiously salivated. 7th.—Passed a good night; two slight tetanic attacks. Temperature 100°·4; pulse 76. To resume the chloral. This improved condition continued up to the night of the 9th, when the patient experienced two violent accesses of tetanus, with emprosthotonos in a marked degree. Temperature 104°; pulse 122. The access was attributed to numerous friendly visits which the patient received during the day. To resume the chloral as before. 10th.—Slept for several hours during the night, but had one tetanic attack, which lasted nearly half-an-hour. He continued without notable change until the 12th, when another very severe access occurred, and

was repeated at short intervals throughout the day; bowels obstinately constipated. Jaborandi resumed. This remedy again gave rise to copious perspiration, followed, as previously, by a marked improvement in the symptoms. Chloral was now substituted for jaborandi, the convulsive symptoms gradually subsided, and the 16th June passed over without any attack of the slightest kind. The patient was soon restored to convalescence, with the exception of a slight uneasy feeling during mastication. On July 4th he was well enough to resume his daily work. (*Gazette Médicale de Paris*, No. 51.)

The Therapeutic Value of Alkalies.—At the Séance of the Academy of Medicine at Paris, M. Gubler gave the results of his observations on the use of alkalies in therapeutics. He observed that M. Mialhe, without entirely absolving bicarbonate of soda, had spoken very lightly of the evils of an alkaline cachexia, and, indeed, almost appeared to throw some doubt on its existence, basing his observations on the fact that the bicarbonate of soda is not heterogeneous, and that moreover it is carried off by the renal organs whenever introduced into the system in excess. But the fact of its being a normal constituent M. Gubler maintained by no means removes hurtful properties from it; for the experiments of Paul Bert have shown that even oxygen when introduced in too large a dose becomes a fatal poison. Moreover, in order that the elimination of the excess should be safely accomplished, it is necessary that the renal organs should be in perfectly normal condition, yet it is just in the diseases accompanying renal affections that alkalies are prescribed. Without exaggerating its frequency, M. Gubler entertains no doubt that an alkaline cachexia really exists, and he is of opinion that if modern physicians have generally shown themselves somewhat timid in the employment of alkaline waters, it is a venial error as compared with the injury that would result from a too free use of such preparations. (*Archives Générales de Médicine*, December, 1877.)

Treatment of Eczema.—Taylor of New York, in an admirable clinical lecture upon the management of this affection, in which the most particular directions for the use of local and internal remedies are given, advises the persistent administration of cod-liver oil in bad cases in children, especially when the eczema is attended with much sero-purulent exudation. He gives with it some preparation of iron, considering the ammonio-citrate by far the best. With regard to arsenic, he thinks that very few cases of infantile eczema need it, and that it will seldom, alone and unaided, cure. He uses it, therefore, only as an adjuvant and in chronic, non-inflammatory stages of the disease. For cutaneous irritation in general, he advises the

administration of ten grains of chloral hydrate with twenty or thirty of bromide of potassium, to be repeated if necessary, and locally a mixture of chloral hydrate and camphor rubbed together with a few drops of glycerine, as recommended originally by Dr. Anderson. (*The Boston Med. and Surg. Journal*, June 7, 1877, No. 23.)

Treatment of Typho-Malarial Fever.—A writer in the *Virginia Monthly Medical Journal* observes that the most essential points in the treatment of this disease consist in controlling the bowel troubles and in giving plenty of good nutrition and stimulants, especially in the latter stages of the disease. To control the bowel symptoms he finds nothing more excellent than subnitrate of bismuth and Dover's powder, unless the diarrhœa becomes excessive, when he employs an electuary of pulverized opium, acetate of lead, subnitrate of bismuth, and glycerine, used as an injection. When the tongue is very red and dry, denoting much inflammation of the bowels, he gives a strong solution of chlorate of potash—most emphatically the best remedy for this condition. All are familiar with its virtues as a therapeutic agent in the treatment of all local inflammations of the mucous membrane. When given internally it can be detected in the urine in less than fifteen minutes. He has used this remedy when the bowels were enormously distended, tongue dry, red, and painted, and in less time than twelve hours—sometimes even within six hours—a change is denoted in the appearance of the tongue; it becomes pale and moist; the tympanitic distension of the bowels is relieved, and the general symptoms denoting inflammation become more favourable. Chlorate of potash comes in direct contact with the inflamed mucous membrane of the bowels, and especially the Peyerian glands. Modern physiologists direct attention to the fact that these glands are the beginning of the lymphatic system in the intestinal canal, although formerly their function or purpose was not known. Flax-seed poultices act well when the bowels are much distended, although sometimes we are compelled to make use of a blister. Turpentine should not be used, from the fact that it so frequently disorders the stomach. He does not think it does any good whatever, unless in getting rid of the gas; then, also, there is danger of its causing strangury. Quinine is of no therapeutic value in the treatment of this disease; in fact he believes it tends to aggravate the symptoms. Sleep must be had, and for this purpose he always prescribes hydrate of chloral and bromide of potassium in combination. This combination acts much better than sulphate of morphia, as it generally produces a dreamless, refreshing slumber; he sometimes uses camphor-chloral. When the temperature is very high,

pulse full and quick, he uses Norwood's tinct. verat. viride, the most reliable of all the arterial sedatives. During the febrile stage he frequently makes use of spts. nitr. dulc. as a diuretic, alternating it with the neutral mixture of the Dispensatory. But as said before, we have no specific treatment for this disease. We can but aid nature, and clinical experience has taught that the remedial agents mentioned above are among the best our profession have as yet discovered. (*Virginia Med. Monthly,* and *Canada Lancet,* 1877, p. 297.)

Topical use of Iodoform for Otitis Media Catarrhalis.—Dr. M. J. De Rossett, of Wilmington, N.C., calls attention to the topical use of iodoform in catarrhal inflammation of the tympanum and Eustachian tube, particularly where there is perforation or loss of the tympanic membrane. In many instances its effect has been little short of marvellous, and in all well marked. Even a case of nineteen years standing was speedily cured as to the discharges, and greatly benefited as to audition. The ears are cleansed in the usual way with a stream of tepid water, and dried with pledgets of cotton. Iodoform is then introduced by a Ranchfuss tube or by means of a cotton mop on a staff in sufficiant quantities to cover thickly the entire tympanum. Repeat this two or three times a week, always cleansing in advance. The *modus operandi* is obvious. Iodoform is a disinfectant; a dessicant which prevents the diapedesis of white corpuscles, and promotes the activity of the absorbent vessels. (*Maryland Med. Journal,* September, 1877.)

Dialysed Iron (*Ferrum dialysatum*).—Dialysed iron was discovered by John M. Ordway, and was described by him in 1857. Messrs. Squire introduced dialysed iron in 1869, and it has also been imported both from France and Germany. More recently it has been introduced into Austria under the name of catalytic iron. It is a permanent neutral, inodorous liquid, of a deep red colour, but transparent in thin layers. It has none of the styptic taste so common and disagreeable in ferruginous preparations. A five per cent. solution should yield three grains of dry residue when sixty grains of it are carefully evaporated to complete dryness. If by evaporation, freezing, or otherwise it becomes too thick or gelatinous, the addition of a few drops of distilled water will bring the solution to the proper consistence, but water containing lime precipitates with it. With arsenical salts dialysed iron acts with great rapidity, even more quickly than the freshest preparation of the precipitated oxide of iron, which has heretofore been held to be the surest antidote for arsenical poisons introduced into the stomach.

Dialysed iron may be administered for months together for all the purposes for which ferruginous preparations are usually

exhibited. Becquerel says of it, and his observations are confirmed by many physicians of eminence, that it produces neither heartburn, diarrhœa, constipation, eructations, nor, in short, any gastric disturbance, and it never blackens the teeth. It is especially in anæmia, chlorosis, palpitations, chronic diarrhœa, gastralgia, dysmenorrhœa, &c., that its use is indicated. It is certainly tolerated well by some persons who do not bear other forms of iron. Dr. Weir Mitchell especially recommended it in a case of extreme exhaustion coming on in a professional pedestrian two weeks after a walking feat of fifty miles in ten hours. But its specific virtue is as an antidote for poisoning by arsenic. When taken into the stomach gelatinous ferric hydrate is produced. It also possesses the great advantage of being always ready for immediate use, and, possessing the virtues of iron in general, will hereafter be found in every drug store and in the saddle-bag of every country physician.

The dose of dialysed iron for tonic purposes is from five to twenty drops four or five times daily. It may be taken in larger quantities, but to no advantage, as only a certain amount is absorbed into the system. From experiments recently made this amount is not more than from fifty to eighty drops per day. Of course, in cases of arsenical poisoning an excessive dose should be given at once. Dialysed iron is best administered by itself upon sugar or mixed with a simple syrup, which is free from an acid, as an acid admixture converts the preparation into a salt of iron. It can also be given in wine or coffee. (*Virginia Medical Monthly*, September, 1877).

Signs by which Phthisis is recognised in its Earliest Stages without the aid of Physical Examination of the Chest.—1. Retraction of the skin over the cheeks.

2. Cerulean hue of the sclerotic, due to anæmia of the conjunctiva.

3. Atrophy of the lips, of the ears, and a thin, pinched appearance of the nose. Whenever the skin closely covers cartilages, as in the ears and nose, a showing through, as it were, of the cartilaginous framework is one of the earliest signs of loss of flesh.

4. Pallor of the cheeks and face as compared with each other and with the malar surfaces.

5. Dilatation of the nostril upon the affected side. This is the case in all pulmonary affections, but especially in the early stages of phthisis.

6. The respiration is invariably accelerated, and the disturbance affects expiration as well as inspiration. In certain nervous disturbances the respiration is accelerated, but it is the inspiration only which is at fault.

7. Sinking of the clavicle more upon the affected side than the opposite, giving the appearance of having a very long neck.

8. Great hyperæmia of the pillars of the fauces, present long before the pulmonary disease manifests itself, and continuing until pus is expectorated. When purulent expectoration is established, decomposed pus irritates the throat, and then the other parts usually becomes hyperæmic.

9. Intense congestion of the throat, early hoarseness, and vomiting are unfavourable symptoms, and indicate enlargement of the bronchial glands. This vomiting is caused by pressure upon the pneumogastric by the enlarged glands. A large proportion of phthisis cases will tell of having had sore-throat for a number of years previous to the development of any chest symptoms. (*Medical Record*, New York, No. 356, 1877.)

Treatment of the Cold Stage of Cholera Infantum.—Dr. E. F. Wells, of Minster, in a paper read before a Medical Society of Ohio makes some suggestions as to the treatment of the cold stage of the cholera infantum. Not a little confusion, he says, has arisen in regard to the proper limitation of the term cholera infantum. It should be applied to such cases only as present a striking, well-known, and never varying array of symptoms, bearing a close resemblance to, or being identical with, the sporadic cholera morbus of adults. Dr. Wells prefaces his observations on the treatment of the disease by the statement of a series of propositions, the truth of which is acknowledged by leading writers:—1. Cholera infantum and cholera morbus are identical, and the post-mortem appearances are the same in both. 2. Cholera infantum is of great fatality. 3. Cholera infantum is a self-limited disease with a duration of not more than three days. 4. If the patient can survive until reaction takes place, he will generally recover. 5. The indications for treatment are to bring about reaction, restore the lost tissues, and maintain the powers of life.

To effect this last proposition there is, Dr. Wells thinks, no agent so sure and prompt as the mustard pack. A cloth sufficiently large to envelop the child from the feet to the chin is saturated with highly sinapized warm water, and wrapped suddenly round the child, the whole being covered with a thick and warm blanket. After the lapse of half an hour, more or less, the change in the appearance of the child, in case the treatment is to be successful is remarkable. Colour and warmth return to the surface, the tissues lose their pinched and old look, a natural perspiration appears, the vomiting ceases, and the alvine discharges become less frequent. The child is now to be taken from the pack, and kept closely enveloped in a warm

blanket. Meanwhile the second indication, supplying the waste of tissues, is to be promptly met. It has been shown again and again, that only the watery and saline constituents of the blood are lost; therefore nothing save water, in which a few grains of common table salt have been dissolved, is required. The formula is water one pint, chloride of sodium ten grains. This is to be given ice-cold as freely as called for; it will many times be rejected by the stomach, yet, in any case, more or less is necessarily absorbed. In extreme cases intravenous injection of water at the temperature of the body (about 100°), should be tried. Rapidly diffusible stimulants, such as ether and ammonia, are indicated on general principles and are to be given as required, but Dr. Wells emphatically protests against the too common practice of drugging, as during the algid stage of cholera infantum the digestion of medicines is totally impossible. For the same reason food should be interdicted during the continuance of this stage. With the establishment of reaction, however, judicious dieting and proper medication may be made to accomplish marvellous results. (*The Cincinnati Lancet and Observer*, August, 1877.)

Glyceride of Oxide of Zinc in Fissures of the Anus.—Rollet recommends the following salve:—Glycerine sixteen parts, starch eight parts, oxide of zinc four parts. The glycerine and starch are to be gently warmed in a porcelain capsule till they form a gelatine, when the oxide of zinc is to be stirred in. The author states that he finds the best mode of treating fissures of the anus is to touch them with nitrate of silver, and then to apply the above preparation. (*Archivio Clinico Italiano*, November 2, 1877.)

Remedy for Whooping-Cough.—M. Dervieux believes he has found a preservative means in aconite associated with ipecacuanha and cherry-laurel water. This mixture is either a veritable prevention or simply an abortive. His formula is as follows:—

Extract of aconite .	·05	grammes	= $\frac{4}{5}$ grain nearly.
Cherry-laurel water	4	„	= 1 drachm „
Syrup of Ipecac. .	3	„	= $\frac{3}{4}$ „ „
Mucilage . .	200	„	= $6\frac{1}{2}$ ounces „

This is given as soon as the characteristic cough presents itself, in doses of a teaspoonful every hour to young infants; two teaspoonfuls to those more than three years of age; and a teaspoonful to adults every hour. (*Lyon Médical*, November 11, 1877.)

Local Treatment of Whooping Cough with Belladonna.—Dr. John Caldwell states that, being impressed with

the apparent truth of Niemeyer's views of the pathology of whooping cough, viz., that it is a catarrh of the respiratory mucous membrane combined with intense hyperæsthesia of the air-passages; and further reflecting on the periodic, rapid, and jactitating cough, the indications of cerebral and spinal complications, and the arterial congestion of the head, he came to the conclusion that all the symptoms pointed to the disease being a periodical affection of the peripheral fibres of nerves distributed to the mucous membrane of the air-passages. The circumstance of his own children suffering severely from the disease, induced him to search for the best and surest method of treatment. He found some advocated quinine for its antiperiodicity, others the light carburetted hydrogen escaping from gas factories, &c., and it at length suggested itself to his mind that a topical application of anæsthetics with gentle astringents would prove the most efficacious treatment. He therefore adopted the following treatment with very happy results. An atomizer is placed on a table in front of the patient charged with fluid extract of belladonna gtt. vi.—xiii., ammonii bromidi grs. xx., potassii bromidi gr. xl., aquæ distillatæ fluiduncias duo. The spray is rapidly carried over the face, mouth, and lungs of the child for ten or fifteen minutes until the pupils are dilated from the effects of the belladonna mixture. The application is repeated morning, noon, and at bedtime. By its means the spasmodic cough is cut short in the course of two or three days. More recently, Dr. Caldwell remarks, reports have appeared of pertussis successfully and almost instantly treated by means of sulphuric ether spray, a method discovered by accident, whilst a fracture in a child suffering from disease was being treated. The first administration of the ether cut short the disease. (*Transactions of the American Medical Association*, vol. xxvii.)

Preparation of Pepsine.—In a discussion which took place at the section on the Practice of Medicine, at the Centennial meeting of the American Medical Association, Dr. Squibb stated that in his experience, which was large, there is no pepsine so active and good as the pepsine a physician makes for himself. A freshly slaughtered pig's stomach should be taken and washed in a little water to separate the mucus and the blood. It should then be chopped up in a wooden tray and bruised. It is then to be put into a bottle and covered with wine containing about seven or eight per cent. of alcohol, in the proportion of two pints of wine to one stomach. For this purpose Malaga wine, which contains about this amount of alcohol, is very serviceable, but sherry, to which the same quantity of water has been added, will do as well. If there is too much alcohol in the pepsine when it is ingested, it will not allow the pepsine to act. (*Transactions of the American Medical Association*, vol. xxvii.)

Treatment of the Sore Throat which may lead to the Development of Phthisis.—The local application of a saturated solution of nitrate of silver in glycerine once in ten days was lately recommended in the Clinic of the Bellevue Hospital, New York, by the visiting physician to the students. The theory was that an acute inflammation had a natural tendency to get well, whereas a chronic inflammation had no such tendency. The object was to substitute an acute for a chronic inflammation, and the inflammation caused by nitrate of silver recovered much quicker than that caused by most of the other caustics. Then use a spray or gargle of common salt-water three or four times a day. Occasionally an antiseptic should be added, and the best was said to be oil of cinnamon, of winter-green, or pepper. These oils all contain carbolic acid. Twenty drops of the oil of cinnamon added to a carbolic acid solution destroys the smell and rather increases its efficacy—certainly does not detract from it.

It was maintained by the visiting physician that enlargement of the bronchial glands was secondary to irritation in the throat, hence the possibility of such sore throats becoming the starting-point of tuberculous development in the lungs must always be taken into consideration. It was also said that, in a majority of cases in which enlargement of the bronchial glands was found at *post-mortem*, it would also be found that the patient had suffered from catarrh of the nose when alive. (*New York Medical Record*, No. 356, 1877.)

Opium and Bromide of Potassium in Heart Disease.—Dr. Henry Huchard has sought to explain the therapeutic action of opium by attributing to it a hyperæmiant action on the brain; but, without giving an explanation, the mode of administration is here given. Preference should be given to preparations of morphia, and especially to the subcutaneous injection of morphia, experience on this point having amply demonstrated on the one hand that large doses of this remedy only are successful, on the other hand that the morphia injected into the cellular tissue is endowed with an action not only more rapid, but slightly differing from that which it possesses when introduced by the stomach. At other times M. Gubler prescribed the tincture of thebaia in five-drop doses three times a day. In the *Revue Clinique de Bologne* Dr. Giuseppe Angrisami has come to the following conclusions with regard to the administration of bromide of potassium; the bromide has no action on the muscular fibres of the heart as digitalis has, and the latter has no action on the arteries; the bromide is a remedy most fitting for correcting functional disturbances of the heart, as frequency, intermittency, arhythm, &c. Whatever be the state of the myocardium, it

modifies advantageously and quickly angina pectoris and palpitations when they are simple neuroses. In cases depending on profound anatomico-pathological lesions of the heart and its vessels, or on compression, the bromide succeeds in producing a more or less lasting improvement. From these facts we may conclude in favour of opium when there is aortic lesion, of bromide of potassium when there is neurosis, and of digitalis in other cases. (*Paris Médical*, August 2nd, 1877.)

Bisulphide of Carbon in the Treatment of Ulcers.—This means has been recommended by Guillemet. The objectionable odour of this agent is said to be removed by combining it with iodine as follows: ℞ Carbonis bisulphidi two fluid ounces, tincture of iodine half a fluid ounce, essence of menthæ viridis sixteen drops, mix. The strength must be adapted to the rebelliousness or chronicity of the ulcers. The mode in which it is used is to apply the liquid with a brush of cotton or charpie, being careful to avoid getting too near to a flame. The brush is passed rapidly and lightly over the surface, which is then lightly dusted with subnitrate of bismuth. A layer of charpie is applied over this, and the dressing confined by a bandage. One application a day is usually sufficient. This method has succeeded in effecting a cure when iodoform has failed. Its application causes severe pain for a few moments. (*Archives of Dermatology.* Quoted in *Virginia Medical Monthly*, Vol IV., No. 6.)

Treatment of Acne Rosacea.—Neumann has recommended a solution of one part of carbolic acid to three or four parts of alcohol as a local application in the diffusely reddened patches of acne rosacea. He reports a number of cases when its use was followed by rapid cure. It is not of much service, however, when there is much infiltration or vascular ectasis. (*Idem.*)

Treatment of Diphtheria by Turpentine Inhalations.—Dr. C. Edel, of New York, regards diphtheria as a local infection, from the beginning affecting the mucous membrane of the nose, pharynx, and larynx, the fatal termination of the disease being brought about by pyæmia. The latter may be either primary in cases where the poison has been absorbed by the capillaries of the lungs or the mucous membranes; or the pyæmia may be secondary to the formation of membranes, and the poison is then taken into the system in the usual manner. The object of the treatment is not to cure the primary pyæmic infection of the "malignant cases," or to cure the "secondary pyæmia," after the formation of membranes, but to prevent the absorption of the poison, the presence of which is indicated by the reactive fever. Since the treatment of diphtheria by steam inhalations gives

relatively the best results, Dr. Edel resolved to combine this method directly with a local disinfectant. For the purpose he uses Tiemann's steam atomizer in the following manner. The boiler to be half filled with water, add about fifteen drops of the oil of turpentine before each inhalation, and then close it. As soon as the vapour escapes the patient is placed at a distance of three inches from the mouthpiece of the instrument. This distance is more convenient than to apply the mouth directly to the mouthpiece, since the greater heat might prove injurious, and the force of the stream would frequently make it inapplicable to children. The inhalations are made every hour for about ten minutes day and night. This treatment has been applied by Dr. Edel with the most favourable results. Recent cases were cured in twelve hours, *i.e.*, the temperature was reduced, and the sores in the throat were clean; in older cases it took sometimes twenty-four hours before the temperature became normal and about forty-eight hours before the pharynx appeared perfectly clear. (*The Medical Record*, January 19, 1878.)

Cure of Tubercular Meningitis by Ergot.—Dr. V. P. Gibney, M.D., gives the history of an important case of tubercular meningitis which he treated successfully by ergot. After giving the diagnosis he thinks that no one who admits the correctness of the diagnosis, will for a moment question the efficacy of the treatment adopted. This is not one of the diseases of which "a natural tendency to recovery" can be predicated. He was careful to administer no other agent, though on the sixth day there was a blister applied to the nape. The history of the therapeutics of this affection abounds in vesicants, and their incompetency to arrest it is too well known to justify any remarks on the influence of the vesicant in this particular instance. The absence of opisthotonos is some proof that the disease did not involve the basal meninges, hence the application of a blister over the nape must have proved powerless to reach the particular seat of lesion. The management of a case Dr. Gibney would conduct as follows:—1. Full and oft-repeated doses of ergot; (*a*), in fluid extract, and to have this retained by the stomach, let bits of ice be swallowed to allay irritability before and after the administration of the dose; secondly (*b*), in pill form, provided the stomach rejects the fluid extract, or provided the patient becomes tired of this form; thirdly (*c*), hypodermic injections should convulsions come on, or should the administration by the mouth be impracticable. 2. Good nutrients, rich milk or even cream, given in whatever form, is most palatable to the patient. 3. Iced bladders to the head throughout the whole course of the disease. 4. Enemata daily. 5. Above all, a quiet room and a faithful nurse, who will permit

no one to do aught that will cause the sufferer the least irritation. (*Medical Record,* November 10, 1877.)

The Air Douche and its Application in Aural Disease.—Hartmann records a series of investigations which he has undertaken both in healthy and diseased persons, on the one hand to determine the physical action and effect of various kinds of air douche, and on the other to test the correctness of different views on the functions of the Eustachian tubes. He first endeavoured to estimate the strength of the expiratory pressure required to produce the crack in the ear known as Valsalva's experiment. The nostrils were closed with an olive-shaped body, of which one was perforated and brought into connection by means of a tube with a manometer. It was found in thirty-one experiments that the sound did not occur until a pressure of from twenty to forty millimeters of mercury had been attained. On three occasions the tube was ascertained to be open, and as soon as pressure was applied the membrana tympani began slowly to bulge. Where catarrh and swelling of the pharyngeal mucous membrane were present, the air only entered under a pressure of 100 to 120 mm. of mercury, though the hearing had not been impaired. Experiments with another apparatus showed that during the act of swallowing a pressure of twenty minims was sufficient (as in Politzer's experiment) to force air into the tympanum through the tube. Hartmann entertains no doubt from these results that in the condition of rest of the muscles connected with the Eustachian tube a free connection between the cavities of the tympanum and of the pharynx is only exceptionally present, and that consequently the respiratory movements observed in the tympanum are due to the to-and-fro movements of the column of fluid present in the tube. On the other hand, in the act of swallowing the tube is opened and air enters the tympanum from the pharynx, though under ordinary circumstances the difference in the pressure of the air in the two cavities is only very slight. (*Virchow's Archiv,* lxx.)

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*** Any of the foreign works may be procured on application to Messrs. Dulau of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Ballière, of King William Street, Charing Cross.

Department of Public Health.

CHOLERA IN RELATION TO CERTAIN PHYSICAL PHENOMENA.

A Contribution towards the Special Inquiry sanctioned by the Right Hon. the Secretaries of State for War and for India.

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[The following article consists of a portion of the introduction and the general conclusions of a Report which has just been submitted to the Government of India, and which we are able to reproduce from an early proof. The complete Report will appear as Appendix to the forthcoming *Thirteenth Annual Report of the Sanitary Commissioner with the Government of India.* Ed.]

The Relation of Soil to Disease.—The question of the influence of conditions of the soil on the prevalence of cholera has been for some years the subject of special inquiry in India, and the primary object of the present report is to show what the results of this investigation have been up to the present time. The varying conditions of the soil are, however, so intimately associated with meteorological conditions in the ordinary sense of the term—the two sets of phenomena acting and re-acting on one another mutually—that, when the subject was entered upon, it was found impossible to leave the matter out of consideration,

and the inquiry has therefore been made a more or less general one into the physical conditions of localities associated with the seasonal prevalence of cholera in them.

That the prevalence of cholera in any locality is more or less affected by the coincident meteorological and other physical conditions is generally admitted by the adherents of all theories regarding the essential cause of the disease, but comparatively little has been done to investigate the actual relation which the phenomena bear to one another. It is true that the special committee for scientific inquiries, appointed by the Board of Health in 1854, included the subject in its meteorological aspect among the matters for investigation, and that more recently the questions of the relation of wind, of soil, and of rainfall to cholera have been discussed by various authorities, such as Drs. von Pettenkofer, Macpherson, Bryden, and Macnamara, but in spite of this there is still abundant room for close inquiry. This is in part due to the fact that most of those who have considered the matter at all have, to some extent, only done so in so far as special phenomena have appeared to lend support to special views regarding the cause of the disease, while neglecting to consider others, which either appeared to have no direct bearing on such views, or were even difficult to reconcile with them.

Under the orders of the Government, daily observations have been recorded at numerous stations all over India, in the presidencies of Bombay and Madras, as well as in Bengal, regarding the fluctuations which the subsoil water undergoes. In the military cantonments these were conducted during 1870 and the greater part of 1871, but in several of the civil stations the registration has been continued until the present time. In 1875 the observations were limited to four or five stations in each province, as, with the information already acquired, it was considered that these would suffice for the future.

The registration of the water-level was undertaken not only for the purpose of endeavouring to ascertain whether any relation existed between the degree of the prevalence of cholera and the hygrometric state of the soil, but also in the hope that continuous and systematic observations of this character might aid in enabling the profession to come to some definite conclusion with regard to the cause of the various fevers which so

frequently recur in certain districts, and cause such terrible devastation.

As is well known, the credit of drawing attention to these matters in modern times belongs to the distinguished Professor of Hygiene at the University of Munich, Dr. Max von Pettenkofer; and their investigation in India was undertaken at the suggestion of the Army Sanitary Commission, in consultation with the late Dr. Parkes and the other Professors of the Army Medical School.[1] As some misconception appears not uncommonly to exist even yet as to the object which Von Pettenkofer had in view in advocating the system of water-level registration, and the method in which the data thus acquired should be interpreted, perhaps it may be advantageous to give a general outline of what we ourselves conceive to be his views on the subject. In his now celebrated lectures on "The Air in relation to Clothing, Dwelling, and Soil,"[2] a lucid description is given of the relation which the air in the soil bears to the air above it: how the air in the pores of the soil is kept constantly moving by the force of the wind passing over the surface of the ground, and by the laws regulating the intermingling of gases—change of temperature, diffusion, and so forth.

As an illustration of the differences which soils present, he points out how experience has shown that in some graveyards

[1] The previous reports which have appeared in connection with the Special Cholera Inquiry sanctioned by the Secretaries of State for War and for India, and which have been published in former Annual Reports of the Sanitary Commissioner with the Government of India, are the following:—

1. Microscopic Appearances of Choleraic Discharges—The Fungus Theory, &c. App. A., *Sixth Annual Report*, pp. 124–178, Calcutta, 1870.

2. Cholera in Madras—Topographical and Microscopic Observations. App. B., *Seventh Annual Report*, pp. 139–236, 1871.

3. Cholera: Microscopical and Physiological Observations—Series I., *Eighth Annual Report*, App. C., pp. 143–203, 1872. (Republished in *Indian Annals of Medical Science*, No. 30, vol. xv. 1873.)

4. Microscopic Examinations of Air. *Ninth Annual Report*, App. A., pp. 1–54, 1873.

5. Cholera: Microscopical and Physiological Observations—Series II. *Tenth Annual Report*, App. A., pp. 173–210, 1874. (Republished in *Indian Annals of Medical Science*, No. 35, vol. xviii. 1876.)

6. The Soil in its relation to Disease. *Eleventh Annual Report*, App. B., pp. 117–143, 1875. (Republished in *Indian Annals of Medical Science*, vol. xviii. 1876.)

[2] *Beziehungen der Luft zu Kleidung, Wohnung, und Boden*, 1872.

the decomposition of bodies is complete in from six to seven years, whereas in others twenty-five or thirty years are required before this is brought about, so that it has become a matter of practical import to ascertain the quality of the ground in this respect, when selecting sites for cemeteries, as the interval which should elapse before a burying-ground may be used again hinges upon the fact as to whether decomposition takes place rapidly or not; hence it may happen that two cities with an equal population may require cemeteries of very different extent. He mentions that several influences combine to bring this about, but the principal one is the amount of, and the facility for, the interchange of the air in the soil—gravelly and sandy soils acting much more quickly than those of marl and clay.

Elsewhere this *savant* points out that changes such as these are materially expedited by variations in the degree of the soil-moisture: wood is preserved as well in water as in dry air, but it rots when subject to alterations of dryness and moisture.

It is not on the particular degree of soil moisture that Dr. von Pettenkofer lays stress, but on the variations in it, and he suggests the fluctuation of the ground-water as a convenient index of this, especially in Europe. With regard to India, however, he throws out the suggestion that experience may show that the rainfall may serve as a clearer index than the water-level, as the former is not so irregularly distributed throughout the year as in Europe. Mr. H. F. Blandford, in a work recently published, also points out the marked difference which exists between European and Indian meteorological manifestations, and remarks that "order and regularity are as prominent characteristics of our atmospherical phenomena as are apparent caprice and uncertainty those of their European counterparts."

Granted that certain organic or inorganic processes take place in the soil and give rise to various diseased conditions, it would still be necessary to show how these changes could affect such portions of the community as spend the greater part of their time in-doors. To this von Pettenkofer replies by instancing cases of poisoning from gas which have occurred in houses unconnected directly with gas pipes. The warmer air of the house acting like a heated chimney, having drawn up the

soil-air through the ground on which the houses stood and thus conveyed the gas which had escaped from pipes placed in the earth outside the dwelling. Instances are referred to of this having occurred, although the gas had to travel some twenty feet under the street and through the foundation and flooring of the house.

Quite recently these statements have received marked corroboration from Dr. Cobelli of Roveredo, who gives details regarding a case of the kind where a mother and her two daughters, a dog and a bullfinch in its cage, were one morning found poisoned in a bedroom. The two daughters were already dead and the bird also; the mother died shortly afterwards; the dog alone recovered. The State ordered an inquiry to be held, as it was scarcely conceivable that the deaths could be attributed to an escape of gas, as no pipes were connected with the house. That gas could get into the room, however, was shown by analysis of the air which it contained, and after minute investigation it turned out that gas was escaping through an imperfectly fitting plug of one of the main pipes which had been sunk about a yard below the surface (in earth of an alluvial nature), and fifteen feet seven inches removed from the room in which the poor people had slept. The gas had been aspired into the room instead of escaping into the street, for the air of the room at night had been warmer than the air outside.

The importance of bearing observations of this kind in mind in connection with attempts at tracing to their source foul emanations from covered sewers and other unwholesome subsoil recesses and tracts is too obvious to require special note.

It is in this light that, as we understand it, Dr. von Pettenkofer suggests that the relation of soil-influences should be studied, and urges that it is absolutely necessary that each locality should be studied for itself at different times, seeing that constant variations take place not only in the generating power of the soil, but also in its porosity, or, in other words, in its capacity for permitting any noxious elements which it might contain to mingle with the upper air.

The relation of the seasonal fluctuations in the prevalence of cholera throughout the Bengal Presidency to coincident

meteorological phenomena is next considered under the following headings; I:—The phenomena of the endemic area, those of Calcutta being compared with those of other stations, and with the phenomena of the area as a whole; II:—The phenomena of the non-endemic area and of special stations in it.

The Report winds up as follows:—

General Conclusions. (1.) *A Comparison of the Principal Physical Conditions Characterising the Various Seasons of Cholera-Prevalence in the Endemic and Non-Endemic Areas.*—Having considered the physical features of the various seasons of cholera-prevalence in those parts of the Bengal Presidency in which the disease is endemic and in those in which its occurrence is occasional only, it remains to be seen how far any community of conditions characterises the seasons throughout both areas, how far prevalence appears to be favoured or repressed by definite conditions independent of mere geographical position of locality.

The following table shows the conditions presented by two typical stations, Calcutta and Lahore, which may be regarded as presenting extreme examples of the characteristics of the endemic and non-endemic areas, both in regard to physical features and cholera-prevalence.

TABLE

Showing the Physical Conditions associated with various degrees of Cholera-prevalence in Calcutta and Lahore.

Physical Conditions.	Endemic Area (Calcutta).												Non-Endemic Area (Lahore).											
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November..	December.
Atmospheric pressure ...	30·01	29·94	29·85	29·75	29·66	29·55	29·54	29·60	29·68	29·83	29·98	30·03	29·28	29·26	29·11	29·03	28·90	28 72	28·74	28·83	28·93	29·11	29·33	29·34
Temperature ...	67·7	73·0	80·5	84·7	86·2	84·9	83·5	83·1	83·3	81·5	74·9	68·1	53·4	59·5	69·0	81·2	88·7	93·0	88·3	87·4	83·5	76·7	64·9	55·3
Humidity.	68	68	67	73	75	83	87	88	87	80	71	68	57	52	46	33	24	32	49	53	53	35	39	50
Rainfall (inches).	0·44	0·83	1·28	2·49	5·46	12·13	12·64	13·71	10·17	5·61	0·66	0·24	0·50	0·91	0·91	0·27	0·92	1·20	6·29	3·89	2·54	0·6	0·0	0·50
Water-level (feet)	Lowest, May, 14·6; Highest, September, 8·2.												Lowest, 37′·0; Highest, 36′·0.											
Percentage of total cholera[1]	3·13	7·04	18·68	17·52	11·98	8·81	8·01	3·97	4·90	5·07	6·80	4·03	0·07	0·00	0·15	0·65	0·60	0·98	3·80	75·22	17·97	0·45	0·03	0·03

[1] European and Native Troops and Prisoners.

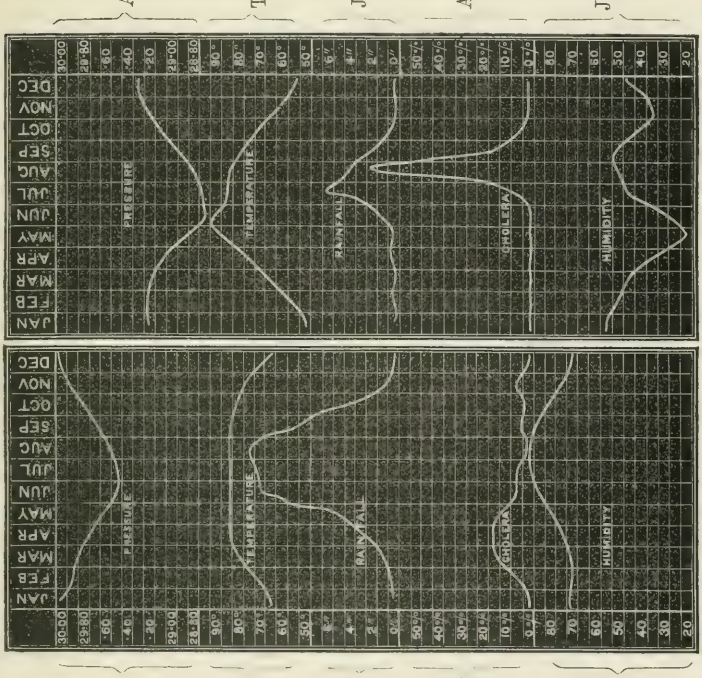

Diagram illustrative of the mean Monthly Physical Conditions and the prevalence of Cholera in the Endemic and Non-endemic areas.—Calcutta and Lahore.

Taking these stations as affording indices of the general characters of the areas in which they lie, we find certain marked apparent contrasts between them in regard to the conditions coincident with maximum and minimum prevalence.

Maximum prevalence in Calcutta occurs coincidently with relatively high atmospheric pressure and with low humidity and rainfall: whilst in Lahore it is associated with precisely the opposite conditions.

The data in the Bengal Presidency afford no ground for supposing that *atmospheric pressure* exerts *per se* any appreciable influence on prevalence; and the contrasts presented by the endemic and non-endemic areas in this respect must be regarded as entirely subordinate to those of relative humidity and rainfall.

With reference to atmospheric *temperature*, in place of contrast there is agreement, and it is corroborative of belief in the actual existence of an influence of temperature on cholera-prevalence to find that very much in proportion to the increase in the difference between the temperature of the various seasons there is a corresponding increase in the difference of prevalence occurring in them.[1] In Calcutta the range of temperature between the coldest and warmest month is 18°·5, in Lahore it is 39°·6, or, stated in reference to prevalence, in Calcutta the difference between the temperature of the month of maximum cholera and the coldest month is 13°·8, while in Lahore it is 34°·0. In Calcutta there is a considerable reduction of prevalence in the coldest month as compared with that of the maximum prevalence—the percentages of total cholera being 3·13 and 18·68; but this is reduced to insignificance as compared with that exhibited in Lahore, where the respective percentages are 0·07 and 75·22.

In reference to *humidity* we find apparent contrasts very sharply defined, more sharply even than those exhibited by the conditions of rainfall. It is questionable how much this difference ought not to be regarded as a mere subordinate concomitant of that in regard to rainfall; but in so far as atmospheric humidity itself can be supposed to exert any influence on the prevalence of the disease, it must be remembered

[1] It will be observed that no special notice has been taken of the question of *range* of temperature as a characteristic of the various seasons. This is not the result of an omission, but as the only thing that could be said regarding it is, that mere range of temperature exerts no appreciable influence on the prevalence of cholera it has not been deemed necessary to occupy space in giving detailed data leading to no further conclusion.

that the contrast lies not so much in absolute conditions of humidity as in relative local conditions. The fact is that the conditions of atmospheric humidity of the two localities come to approximate most closely at different seasons—the approximation occurring when the humidity of Calcutta is at its lowest and that of Lahore at its highest. Putting January and February aside as months in which conditions of temperature exert a disturbing influence on prevalence, we find that the conditions of humidity in Lahore most closely approaching in degree those present in Calcutta during March and April are those of August and September. The contrast presented by the two localities, then, in reference to conditions of atmospheric humidity and cholera-prevalence is one in regard to relative local condition only, the absolute humidity of the localities during their seasons of maximum prevalence is comparatively similar. The same final result may be obtained by additions in one case and by subtraction in another, according as the basis of calculation be greater or less.

This must be borne in mind in reference to the next point also—the contrast between the conditions of *rainfall* associated with prevalence of cholera in the two localities.

In considering the physical conditions of Calcutta we found reason to regard the influence of rainfall as a mediate one, acting through the agency of its direct effects on the soil. In Calcutta, no doubt, the influence of rainfall appears to be mainly exerted through its effects on soil-ventilation, and here there can be no question as to the existence of an apparent contrast between the conditions coincident with maximum prevalence in the two localities. In so far as rainfall acts in obstructing soil-ventilation there is certainly a manifest contrast between the conditions coincident with maximum prevalence in Calcutta and Lahore. The rainfall in the two localities is, however, so very dissimilar, that even were their soils precisely identical in nature, similarity in their effects could not be looked for. The effects on soil-ventilation produced by a fall of 3″·89, which is the average amount for August in Lahore, must patently be very different from that of the contemporaneous fall of 13″·71 in Calcutta.

Direct observations are still wanting on the effect of the

rainfall in the stations of Upper India on conditions of *soil-ventilation*; but the data furnished by the present example are sufficient to show that it is idle to found conclusions on comparisons of local relative conditions, and that it is the absolute conditions coincident with various seasons of cholera-prevalence which must be compared with one another. The rainfall and soil of one place may be such that maximum rainfall effectually interferes with soil-ventilation, whilst in another they are so different that little or no effect is produced.

Rainfall, however, may influence the local prevalence of cholera by means of its influence on the soil in various ways. It does not only act on the ventilation of the soil, it also acts on its conditions of moisture, and, indeed, it is only in doing so that it affects the ventilation. If the development of the cause of cholera in a locality be dependent on local conditions of soil, as there is much reason to believe is the case, it is surely conceivable that one of these conditions is a certain degree of moisture. Granted this, and there can be no difficulty in assuming that given localities may fail to produce cholera either on account of the soil being too damp or too dry, and that the conditions ensuring development might be provided in one case by diminishing, in the other by increasing, the amount of moisture present. Looked at in this light, the apparently contrasted conditions of rainfall coincident with maximum prevalence of cholera in stations such as Calcutta and Lahore practically disappear. As in the case of the humidity, the contrast is one between local relative conditions only, not between the final result of the action of these conditions, or even between the absolute conditions themselves.

In regard to water-level little need be said, as it has been already indicated, that in this country data of rainfall are more generally applicable as indices of conditions of local soil-moisture than fluctuations in water-level can be.

Calcutta and Lahore have been selected as typical examples of localities in the endemic and non-endemic areas regarding which we have relatively satisfactory data for comparison. The remarks made regarding them are, however, generally applicable to the other stations within these areas. Calcutta and Lahore

are no doubt extreme examples of the characteristics of these areas, both in regard to seasonal distribution of cholera-prevalence and to the coincident physical phenomena, and the phenomena of every locality must be scrutinised in detail for themselves. Lahore is peculiarly distinguished by the smallness of its rainfall, and many other stations within the non-endemic area may be pointed out where the season of maximum cholera is coincident with considerable rainfall. The evidence of the influence of soil-ventilation on prevalence is certainly not so manifest in these cases as in regard to Calcutta. Before any conclusions can be arrived at, however, on this point, data derived from direct observation regarding the actual influence exerted on the soil-ventilation must be acquired, and in the meantime it is well to bear in mind that we have no evidence to show what the effect of the addition of moisture to the soil without coincident obstruction to soil-ventilation might be. We do know how much cholera arises under existing circumstances; we can form no conception as to what the amount might be under the hypothetical ones.

(*To be continued.*)

ON DISINFECTION BY HOT AIR.

BY DR. E. VALLIN,

Professor of Military Hygiene, Val de Grace.

(*Continued from* p. 240.)

WHAT IS THE BEST ARRANGEMENT FOR AN APPARATUS?

THEORETICALLY the following conditions should be regarded as indispensable for an apparatus:—

1. It ought to possess an automatic regulator so as to obviate ill-effects from the carelessness of the person in charge, and it should be so constructed as to give certitude that the temperature will never exceed 230° Fahr., or sink below 212°. If articles exposed in it cannot be secured from damage by too great heat, the repugnance to the use of the apparatus by

persons responsible for the articles will be invincible and justifiable.

2. The temperature should be equal in every part of the apparatus. When the walls are constructed of metal they will heat more rapidly than the interior, and if they are not well guarded, articles coming in contact with them will suffer.

3. The circulation and renewal of the hot air in the chamber should be active, not only for the purpose of maintaining equality of temperature in all parts, but also to facilitate the more rapid penetration of the heat into the interior of voluminous articles subjected to it.

4. There should not be any danger of ignition or explosion, and the working of the apparatus should be easy and not expensive.

Let us see to what extent these desiderata have been realised in the several apparatuses which have been in operation for some years among our neighbours.

To make this description more compendious the several apparatuses may be grouped in two classes, each class representing a particular type of which the apparatus is a more or less happy modification.

A. In the first type the chamber is heated directly by a furnace placed below it, or in the vicinity. The simplest and most complete example of this sort of chamber is that by Ransom at the *Nottingham Hospital* in 1871.[1] It consists of a large iron closet of twenty-five cubic feet capacity, and of which the walls are covered with wood and felt to prevent the loss of heat. The heat is obtained by the combustion of gas from a certain number of lights in a short, horizontal tube which opens, after a slight bend, on the lower wall of the chamber. The outer air enters the chamber through this tube, being heated by the gas jets in its passage; and the heated air escapes from the chamber through another tube which opens from the upper wall. A Kemp's mercurial automatic regulator (or some other) governs the amount of flame from the gas jets, and keeps the entering air at a uniform temperature. In the outlet tube a gas jet is placed for the purpose of destroying any

[1] W. H. Ransom, "On the Mode of Disinfecting by Heat." (*The British Medical Journal*, 6 Sept. 1873, p. 274.)

impurities which may be carried up by the air which has served for disinfection. This apparatus has been kept in action without interruption day and night, for a year and a half, without supervision or repair, always ready; and during an epidemic of small-pox it served for the disinfection of all the infected or suspected bedding and clothing of the hospital. The gas consumed averaged a little under a cubic foot per hour, and the cost did not exceed threepence each exposure of articles. The temperature of the chamber never fell below 230° Fahr., and never exceeded 249·8–255·2 F. The daily oscillations in the temperature often did not exceed 4° Fahr. Articles, as a rule, were kept in the chamber three hours.

This apparatus appears to be simple, economical, easy to establish and to manage. Nevertheless, it would be an advantage to line the metal walls of the chamber with wooden trellis-work, or better still to substitute for the metal glazed brick. Then Ransom makes use of thoroughly dry air. This seems to me a disadvantage. It would be easy, however, by interposing a reservoir of water in the course of the current of hot air passing to the chamber, to give to it sufficient humidity.

An analogous system to that of Ransom, but much more elementary in conception and execution, is in operation at the *Golden Lane Mortuary* of the *City of London.* Articles are here disinfected in a vaulted chamber, six feet eight inches in height, of which the walls are lined with glazed bricks. At the bottom of this chamber is a circle of gas jets which serve for heating it. There is no means of regulating with precision either the inlet or the outlet of air; and the temperature varies according to the number of gas jets alight. The interior arrangements of the chamber are very primitive. The articles of clothing are suspended upon iron rods above the gas jets, and more than once it has happened that the articles have been destroyed by fire.

At *University College Hospital,* the disinfecting chamber is built of masonry with double walls. Its height is six feet eight inches, its breadth five feet. The air is heated by a cast-iron stove of large surface which is fed with combustibles from without. This furnace is sustained in action by both the exterior air and by the air within the chamber, which has

served for disinfection. This inner air is drawn off by channels constructed in the walls of the chamber, and which opening on the roof communicate with the space beneath the furnace. By this arrangement the furnace exerts an energetic exhaustive action on the air of the chamber. The cost of the working of this chamber is stated to be small, and the temperature can be easily elevated to 302° Fahr. The regulation of the heat of the chamber rests with the attendant solely, and if he fails to consult the thermometer, the articles exposed may be subjected to burning.

In *New Bird Street*, Liverpool, there are four disinfecting chambers, built of masonry and measuring twenty feet in height and seven feet two inches in depth. The flooring is formed by a double range of perforated iron plates which can be moved, one range upon the other, so as to open or close communication with a large subterranean canal which serves for the passage of hot air. The furnace consists of a large stove placed in a deep excavation, the smoke-pipe of which is carried backwards and forwards with numerous turns in the canal above referred to, which passes beneath the chambers, and, after having heated the air of the canal, terminates in a tall chimney. The impure air of the chambers finds an exit from them through the roofs into a channel which also communicates with the chimney. Iron frame-work attached to the walls admits of articles of bedding or clothing being spread out or suspended. The temperature of these chambers can be elevated to 280°·4 Fahr., but the absence of any apparatus for regulating the heat destroys all security as to the results obtained. The movement of the hot air, however, is rapid, and the temperature is sensibly equal in all parts of the chambers.

An apparatus almost identical with the foregoing exists at the *Munich Hospital*. The floor of the chamber in this example is formed by a plate of cast iron which covers a central heating canal, and not by movable perforated plates. This metallic flooring is apt to become overheated, and thus to endanger the articles suspended for disinfection in the chamber. To prevent accidents from this source, the plate is covered with a layer of sand.

At the *St. Louis Hospital*, Paris, there has been constructed,

and has now been in operation for several years, a long and lofty brick stove, designed for the disinfection of the clothes of persons suffering from itch. An ingenious system of iron tubes the length of the stove, gliding easily upon rods double their length permits the rapid introduction, suspension and withdrawal of articles subjected to disinfection, access being given to the interior of the stoves, by very narrow panels opening as doors. Unfortunately, here also there is no apparatus for regulating the heat, nor any means of measuring easily the degree of temperature in the chamber. The person who has for several years been entrusted with its charge, has never used a thermometer, and he is unable to say whether the chamber can be heated to 140° F. or to 248° F. The apparatus is in other respects well-constructed, and its dimensions admit of many articles of clothing and bedding being disinfected at the same time.

B. The second type of disinfecting apparatus is represented by a chamber heated by superheated steam circulating around it within double hermetically-sealed metallic walls. Upon this principle Dr. Heury, in 1832, constructed several disinfecting apparatuses in Manchester, which proved very useful during the epidemic of cholera of that year. Starting from this point, Dr. Esse has established at the *Berlin Hospital* a stove constructed after this type which has worked well.

Two cylinders of iron of somewhat different dimensions are so arranged that the smaller is contained within the larger, an interval of several inches separating them laterally and at the bottom. The smallest cylinder (diameter = 36 inches; height 56 inches) is for the reception of the articles to be disinfected. These are suspended from hooks attached to the interior. A trellis work of wood lines the interior to prevent the articles being damaged by overheating of the metal. The greater cylinder (diameter = 40 inches; height 60 inches) is lined with felt to prevent loss of heat. This cylinder is buried in the soil so that the upper edge rests above the ground at about the height of a table, thus rendering the management more easy.

Both cylinders are hermetically closed by means of a complicated cover which is worked by the aid of a counterpoise. Steam under a pressure of two atmospheres is then admitted

into the space between the two cylinders, a safety-valve regulating the pressure to a nicety, and consequently the temperature. In less than an hour the temperature of the inner cylinder reaches 233°·6 F. The water by condensation deposited between the two cylinders runs through a tube into the steam-boiler, the pressure there being less than in the interval between the cylinders. The temperature of this apparatus can be maintained with great constancy over a long period of time, and it is lowered but slightly during the time when the cover is raised for the withdrawal or introduction of articles.

This apparatus serves chiefly for the disinfection of articles of clothing, and especially for the clothing of persons affected with itch or infested with vermin. For the disinfection of mattresses a large cast-iron box has been constructed $8\frac{3}{4}$ feet in length, 3ft. $3\frac{3}{8}$in. in breadth, and 4ft. $4\frac{1}{2}$ inches in height. The walls of this box within are lined with iron tubes (1 inch in diameter) arranged in very close spirals, in which circulates steam under a pressure of two atmospheres. A wooden trellis is placed above these tubes to prevent accidental contact with any articles placed in the box. The apparatus acts much as the one previously described, the serpentine tube taking the place of the inner cylinder; but the box is simpler in construction, less expensive, and it can be made of greater dimensions.

Notwithstanding the great advantage of a temperature nearly constant and measurable by the pressure exercised by the steam, this kind of apparatus has a serious inconvenience. The air in the interior of the cylinder or box which serves for disinfection cannot be renewed, it does not circulate, and in consequence it penetrates with difficulty into the central parts of voluminous articles which are bad conductors of heat, such as mattresses. The establishment of apparatuses of this kind is particularly convenient in conjunction with wash-houses and baths, where steam is easily obtained, and the water of condensation disposed of without difficulty. The danger of explosion practically does not exist under the feeble pressure to which the steam is subjected.

In the different arrangements described, the hot air is used almost completely dried, and no attempts have been made to restore it to its humidity. This dryness appears to me to

have several inconveniences. First, when the articles for disinfection are damp or wet the evaporation is extreme, and it may prevent during a part of the operation the central parts of articles which are of large volume from being heated to a sufficient temperature for disinfection. To this influence the result of one of Ransom's experiments must be assigned. The experiment was as follows: A very thick, wet cushion, stuffed with hair, was submitted in his apparatus to a temperature of 239° F. At the end of 23 hours, the outer layer of hair was seriously damaged by the heat, nevertheless the central temperature of the cushion did not pass beyond 176° F. The intensity of the evaporation had prevented the central temperature rising beyond this point—a point quite insufficient for disinfection—although the superficial layers of hair had been so much injured by the long exposure to heat.

Moreover, the observations of physiologists of the oldest date have proved that the inferior organisms resist the highest temperatures when they have been completely dried; and it has been already noted that M. Davaine in his experiments destroyed the virulence of anthracoid (charbonous) liquids at a temperature of 131° F., while the bacteridia of splenic fever resisted death even after exposure to a temperature of 212° F., provided that they had previously been dried by the agency of quicklime.

Disinfection would then be more constantly secured if the air used were not saturated, for this would be inconvenient, but given a high degree of humidity. This condition might easily be obtained either by passing a fine jet of steam into the interior of the several apparatuses heated by steam, or in the apparatuses treated by hot air passing the heated air, before it enters the chamber, over tanks full of water. Moist air is the best conductor of heat, and thus it facilitates the penetration of the heat to the central parts of infected articles. Further, it has appeared to me that moist air, unlike dry, hinders the discoloration of white woollen articles.

To what apparatus should the preference be given? Esse's and Ransom's have both undoubted advantages. Both can be constructed in the form of large closets, similar to that constructed at St. Louis, and to those which exist in many

hospitals for drying linen. Movable superposed frames serve in the apparatus referred to for the reception of coverlets and mattresses.

Where gas exists and can be supplied at a low price, Ransom's apparatus appears to be the best. The expense of constructing this apparatus is moderate, the cost of its working almost nothing. The expense of working this apparatus for four hours—a time sufficient for the ordinary daily use of a large hospital—can be limited to *threepence*. The apparatus requires of necessity a trustworthy automatic regulator. This instrument is very fragile, but several varieties are now constructed in great perfection and can easily be obtained. It would be an improvement, as already pointed out, to place in the tube which contains the gas jets, or on the floor of the apparatus, under the wooden trellis-work, a large vessel of water in order to maintain the hot air at a certain degree of humidity.

Esse's apparatus, of the form where the interior cylinder is replaced by a cage in wood, and which has been in operation for several years in the Berlin hospital, is perhaps best adapted when the disinfecting chamber is annexed to the baths of a large hospital, or to a public wash-house in which steam is used. In these establishments steam is produced at a pressure sufficient for the purposes of the apparatus. An assured tension of two atmospheres is required, corresponding to a temperature of the steam of 248° F. The arrangement of the safety-valve needs to be carefully regulated in order to avoid over-heating of the air within the apparatus. This air might be maintained at a proper degree of humidity by throwing a thin jet of steam, governed by a tap, into the chamber. Apertures in the cover would enable a circulation of the heated air to be established with an outlet into a chimney.

The details of construction are for the engineer; the physician is limited to stating the general principles and formulating the particular objects to be obtained.

Without pronouncing a definitive opinion upon the value of disinfection by hot air, it appears desirable that an effort should be made in Paris, or elsewhere in France, to introduce a method of procedure which seems to have proved of unquestioned utility in foreign countries.

THE PRACTITIONER.

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Original Communications.

ON NITRE-PAPER FUMIGATION AS AN EXPECTORANT.

BY DYCE DUCKWORTH, M.D., F.R.C.P.,
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It seems to be inseparable from the every-day practical pursuit of medicine that good remedies and methods of treatment should occasionally be lost sight of and forgotten for a time.

As new medicines and plans of treatment come to be employed (and such a proceeding is incumbent on all practitioners who are not content to work on a narrow line, and to become mere creatures of routine), we are prone now and then to let go some well-proved remedy, and to neglect its use till reminded of it once more by some particular case or circumstance.

That such forgetfulness has led to the disuse of, or very occasional resort to, the method I here recall attention to, can hardly be doubted, for I suppose those who know the proper value of nitre-paper fumigation will willingly accord to this plan of treatment a not unimportant place in the category of expectorant remedies.

I believe the practice of nitre-paper fumigation originated in France, and is much employed in the bronchitis of the aged in that country. Trousseau commended the use of this and other

fumigations in several pulmonary affections, notably that of arsenical preparations in cases of neurotic asthma.

I first learned the value of it from the teaching and practice of that eminent therapeutist, Dr. Nevins of Liverpool.

The class of cases in which resort may be had to this means is chiefly that of bronchitis in aged and enfeebled persons.

The last few weeks have presented most practitioners with a large field for the use of fumigation-therapeutics, for polar winds have cruelly devastated the greater part of Europe, and laid prostrate whole hosts of people with every degree of bronchial trouble.

We are only too familiar with cases of senile bronchitis in which prolonged fits of violent and exhausting cough are ineffectual to the clearance of the bronchial tubes and trachea. With all our best efforts in the direction of stimulating expectorants and pneumo-musculo excitants, we not seldom fail to afford relief to such sufferers.

The irritation induced in these cases is sometimes sufficient to induce very definite asthmatic paroxysms, lasting either a few minutes or for two or three hours.

We are then presented with an indication for the employment of remedies such as stramonium, belladonna, or even lobelia. We may give these at night, for it is found that this untoward complication is most apt to occur during the night, the patient being awoke from sleep by an attack of ineffectual, although prolonged, cough. Given either by way of pill in anticipation of such an attack, or by the method of inhalation according to the Pharmacopœia formulæ for the various *Vapores,* at the time of the paroxysm, we may endeavour to give relief.

In any such case it will be well to try the effect of nitre-paper fumigation. It is found that the inhalation of the products of its combustion excites usually effectual cough, acts as a very efficient expectorant, and allays spasm.

Some years ago I recommended to Messrs. J. Bell and Co. that they should paint over this nitre-paper several coatings of Friar's Balsam, and I have found this to be a very useful addition. The paper ought to be the coarsest brown paper procurable, the old cordage in it proving of value in giving off tarry empyreumatic fumes, and these together with the oxygen

gas evolved from the potassic nitrate, and the benzoic acid from the compound tincture of benzoin, form a suitable stimulant and balsamic smoke for inhalation.

The bed-curtains should be drawn around the patient while the paper is burnt, so that a fully charged atmosphere may be inhaled, and a piece of paper not less than four or five inches square should be used each time. The process may be repeated several times a day.

The great advantage of this medication is its simplicity; it is also within the reach of all classes of patients.

I would not close this brief communication without remarking that the distinct value of warm cordial drinks is somewhat lost sight of as a powerful expectorant means. A cup of hot tea or coffee with a little brandy or essence of ginger, or a draught of hot water to which some essence of peppermint or spearmint is added, is eminently effectual as an expectorant by stimulating the gastric branches of the vagus in the first instance.

Some such drink should be given during the night, or early in the morning, to aged and enfeebled sufferers from bronchitis.

THE LAWS OF THERAPEUTICS.[1]

BY WILLIAM SHARP, M.D., F.R.S.,

Fellow of the Royal Medical and Chirurgical Society. Formerly Senior Surgeon of the Bradford Infirmary, and first President of the Bradford Philosophical Society, &c.

THE world in which we live sets before us many sights of beauty, and many of sadness. Among the beautiful sights are men, women, and children, healthy, busy, and gladdened with life; all can look at these with happy and thankful hearts. Among the sad ones are our fellow-creatures in bodily suffering, sickness, and death; and in civilised nations men are set apart to look at these sad sights, and have the duty laid upon them of trying, to the best of their power, to lessen the weight of this suffering.

These men have worked, for many generations, with unwearied industry, but with so little success that they have often been exposed to playful satire. "This body of men," the *Spectator* said, a century and a half ago, "in our own country may be described like the British army in Cæsar's time: some of them slay in chariots and some on foot!" In our own day some are said to kill by doing too much; others by doing too little; and others again by doing nothing at all. They have been humorously styled "a murderous profession:" this hits rather too hard: perhaps they are *homicides by misadventure!*

[1] The Editor would remind the readers of the PRACTITIONER that he does not hold himself identified with the views expressed by contributors. The present paper contains many opinions with which he does not at all agree, but they are those of one who has devoted the greater part of a long lifetime to the study of the subject he discusses, and as correct conclusions are most easily reached by a knowledge of all sides of a subject this paper may be welcome to the readers of this journal as giving one side of a disputed question by one of the ablest living exponents of the opinions he holds.

It behoves physicians to take heed lest there should be a grim side of truth to any of these words.

It is doubtless the desire of every member of the medical profession, that there should be no truth in this banter; yet every thoughtful man feels that the difficulties of his task are oppressively great, and that his success in lightening these difficulties has been painfully small; and the question forces itself upon him, Are we walking in the true path? Is there any other? Two facts then stand up—a long and expensive education has been completed, and by continued hard work a good position has been attained; and another question rises up—Are these to be put in jeopardy by so great a change as that of entering upon a new path? No: such a change is not thought of in this paper. Good old Dr. Heberden began the preface to his *Commentaries on the History and Cure of Diseases,* by quoting from Plutarch, that "the life of a vestal virgin was divided into three portions: in the first she learned the duties of her profession; in the second she practised them; and in the third she taught them to others." And he adds, "This is no bad model for the life of a physician."

Such an example deserves to be followed, and this essay is affectionately addressed to the younger members of the medical profession. The ambition and uncharitableness of attempting to disturb the tranquillity of the senior members are not entertained; so that if any of these begin to read they are, with submission, recommended to stop. No physician above forty years old, unless perchance he should have doubts remaining as to the perfection of the system which he has embraced, need disquiet himself by reading any more of this paper. What follows is said to the young:—

Your studies are extensive and various; the crowning struggle is the use of remedies. To this all other studies, however excellent and necessary, must be viewed as preparatory and subordinate. This last effort—therapeutics—is itself also so vast and various that, to succeed in accomplishing it, it must be divided into portions. The portion which we have now in hand is *the use of drugs as medicines.*

If you would investigate any branch of science with success some preliminaries must be settled first. For instance:—

Is the proposed subject to be studied in its physical or its metaphysical aspect? In this paper only what is physical, that is, open to the observation of our bodily senses, will be thought of. The so-called "higher regions of metaphysics," from Locke to Kant and Hegel, will be studiously avoided. To mingle metaphysical thinkings with physical observations would be to plunge into a hopeless labyrinth of darkness.

Is the inquiry to be theoretical or practical? This paper will contain no hypothesis or theory whatever; it will be wholly practical, and as such well suited to the pages of the *Practitioner*. Moreover, the scientific words and phrases to be made use of must be accurately defined. The limits of the subject to be studied must be clearly understood.

The observations and experiments referred to must have been made with all possible care and correctness, in order to take their place as particular facts. The induction from these of general facts or laws of nature may then follow. And the deduction from the general facts of practical rules or laws of therapeutics.

Definition of words.—The following words and phrases will in this paper be used only in the restricted senses here given to them in the hope that misunderstandings and useless controversies may be avoided:—*Phenomena*—appearances; whatever can be recognised by the senses, and nothing which cannot be so known. *Particular*—an individual fact; *e.g.* opium acts on the brain, arsenic acts on the stomach, digitalis acts on the heart. *General*, applied to facts or laws, has the meaning of universal; a general fact or law includes all the particular facts of the case which are already known, and is expected to include all new facts belonging to the case, as they are discovered: *e.g.* in chemistry elementary bodies combine to form compounds having new properties *in fixed proportions*. *Remedy*—is limited in this paper to drugs as medicines; as commonly used its meaning is so comprehensive and vague as to unfit it for admission into a scientific proposition. *Induction*—a mental process carried on by considering or examining the known individuals constituting a class, and trying to find out facts which belong to each of them, *besides that which has served to put them into the class*. It

is ascending from particular up to general facts: *e.g.* in astronomy, the irregularities in the motions of a few stars put them into a class called planets or "wanderers;" after Copernicus had found that the sun was in the centre, their orbits were *theoretically* said to be circular; Kepler proved them as a *fact* to be elliptical (his first law). *Deduction*—the inverse mental process by which applications of laws or general facts are made; or by which we descend from them to new particular facts; *e.g.* it may be said beforehand of a new metal that it will have fixed proportions in which to combine with others. *Laws of nature*—these are general facts discovered by the process of induction from particular facts. Their permanence is relied upon, because *the law of continuance or uniformity* is itself one of these inductions: *e.g.* since it was discovered that one volume of oxygen and two of hydrogen combine to form water, it has not been doubted that as long as water exists it will always be composed of the same elements and in the same proportions. *Drugs*—There are no breaks in natural objects; every one of them is connected, by easy steps of slight change, with every other. But in studying these objects we are obliged to make divisions by arranging them in classes: *e.g.* we speak of the animal, vegetable, and mineral kingdoms, and the difference between a horse, a tree, and a rock is manifest; but by gradual steps qualities disappear until we find a *sponge* belonging to the animal kingdom, and even the *Comatula rosea* apparently belonging to all the three kingdoms, for they "start as stone-flowers, and then break off their stalk, and go about with legs and arms." *Nihil per saltum* is true on all sides, and this general fact is called *the law of continuity.* If you would study nature successfully you must have divisions, yet these divisions are necessarily arbitrary. In this way only can what is meant by *drugs* be defined. With reference to our present study, natural objects are either food, stimulating or refreshing beverages, or drugs. Food, solid or liquid, makes blood and nourishes the body; drinks containing alcohol, or decoctions and infusions of coffee, tea, cocoa, &c., are stimulating or refreshing beverages; the rest are *drugs.* You will understand, therefore, that in this inquiry into the properties, actions, or effects of drugs, everything which is taken as food, or as a beverage, is excluded. You

will also notice that the substances thus classed together as drugs have no agreement in their *natural history* classification; nor in their *mechanical* properties; nor in their *chemical* composition or reactions; nor in their *electrical* or *magnetical* properties. They agree in this, that when taken or absorbed into the living human body in any doses, they act injuriously and are disturbers of its healthy condition; and when the effects of a drug in health are known, it may be used as a medicine or remedy in disease.

Action of Drugs.—By this is meant only such effects of drugs as can be recognised by the senses; not the "causal connection" between the drug and these effects; phenomena or appearances only, not hypothetical explanations of the manner in which the effects are brought about.

Action and re-action.—These terms belong to such natural conditions as cold bathing succeeded by a glow of warmth; exercise followed by fatigue. Such alternations are not only consistent with health, but are essential to its preservation; they are not, in any sense, disease. *Stimulation and collapse.*—These have reference to the action of alcohol; of mechanical applications; of electricity, &c. Within moderate limits they are not disease. You will notice that the collapse produced by these causes is in proportion to the previous stimulation. The excitement and depression produced by drugs *are not in proportion to each other.*

Physiological action. — The effect of drugs when taken in health. *Therapeutical action.*—The beneficial effects of drugs when taken in sickness. *Local and topical action.*—Local action is the effect produced when the drug has been absorbed, and is commonly at a distance from the place of absorption; topical action is the effect produced on the part to which the drug has been applied. *Primary and subordinate action.*—Primary or principal action is that on the organ on which the drug acts first, or in the most powerful manner; subordinate action is that on other organs on which it also acts, but in a less degree.

Double and contrary action.—The effects of different doses of the same drug, when those of one dose are in the opposite direction to those of the other.

Primary and secondary action.—When an effect of one dose is followed by another effect in the opposite direction; this belongs to all drugs, but not to all doses.

Limitation of Subject.

A plain statement of the boundaries of the subject in hand will also help to prevent misunderstanding and controversy. The following limits will be observed:—*Experiments on man.*—All experiments on the lower animals are rejected as cruel, unnecessary, and misleading.[1] The action of drugs is sought to be discovered by experiments on the human body alone.

Experiments in health.—Under the conviction that the action of drugs can never be learned from experiments on the sick, for then it is necessarily interfered with, or complicated by the action of other causes of disease, the only experiments which will be relied upon are those upon ourselves and others in a state of health.

Phenomena of drugs only.—It is also considered essential to exclude all effects arising from other causes; *e.g.* from mechanical, chemical, mental, or moral causes; or from heat, light, electricity, or magnetism; and to confine attention to the effects produced by drugs only.

Laws of these phenomena only.—In like manner the laws of mechanics, of chemistry, of heat, of light, &c., are considered inapplicable to the phenomena of drugs. They may sometimes be referred to for analogies, but analogies are not proofs. Hahnemann caught at the first glimpse of a new truth, made a theory of it, and then applied it to other classes of facts quite different from those which had suggested it to him. Others are now engaged in committing the opposite error, and are taking the facts and laws which belong to and are true in other departments of nature, and are applying them to the action of drugs, to which they do not belong, and in which they are not true.

[1] *Vide* note, p. 324.—Ed. Pract.

Particular Facts.

These facts must belong to drugs; they must be their specific or peculiar effects on the living human body. If they are not, for instance, if they are mechanical effects, as of pressure, or chemical, as corrosive, or electrical, or magnetical, they are not admissible in this inquiry. In the same manner the effects of heat and cold, of light and darkness, of food and drinks, of exercise and rest, are excluded. *These are not drugs*, and their actions and effects are not the actions or effects of drugs. To make use of them as proofs or illustrations of the action of drugs is to be misled.

You will also remember that you are now looking at the action of drugs from a new point of view. You are looking at the effects of drugs in health, not in disease.

But, even when thus restricted, the number of facts to be included in this view is very great. All the effects of each drug, when taken in health, in all doses, will form a vast collection of particular facts.

It is evident, therefore, that nothing can be done in this paper beyond mentioning a few of these facts as illustrations of what is meant. Details sufficient to prove the general facts or laws which will follow must be sought elsewhere.[1]

Opium.—It is well known that the action of opium is primarily upon the *brain*, and that the effects of a certain range of large doses are oppression, drowsiness, stupor, and even apoplexy; there is another range of smaller doses, the effect of which is the opposite one of excitement; and there is an intermediate range of doses which produces both these effects in succession. The action of opium on the *heart* is similarly characterised; the range of large doses has but one action, that of depression; there is a range of small doses which also has but one action, the contrary to that of the large doses, that of quickening the heart's beating; and there is an intermediate range of doses which has both these actions, the second contrary to the first. The action of opium on the *stomach* is, in the large doses,

[1] It is necessary to refer here to the *Essays on Medicine*, which may be had of Mr. Leath, 5, St. Paul's Churchyard.

to destroy the appetite, in the smaller doses, to increase the appetite. The action of opium on the *bowels* is, in the larger doses, to cause constipation, and in the smaller doses relaxation.

Belladonna.—The sap of the plant (*Atropa belladonna*) diluted with alcohol; the effects of this, in certain large doses, on the *brain, eyes, throat, heart,* and *skin* are sufficiently known, especially its characteristic dilatation of the pupil; a certain range of smaller doses acts in the opposite direction, as may be readily seen in the contraction of the pupil and in the effects produced on the heart. There is also an intermediate range of doses, as is proved by the action on the heart; the larger doses quicken its beats, the smaller slow them, and the intermediate doses have both actions in succession.

Calabar bean (*Physostigma*).—This is mentioned now only on account of its action on the *iris;* the effects are the reverse of those of belladonna: certain doses contract the pupil, certain smaller doses dilate it.

Aconite (the sap of the *Aconitum napellus*).—The action of this plant on the *heart* is very remarkable, and is easily ascertained by experiments in health; certain large doses quicken the beats of the heart, certain small ones slow them; certain intermediate doses do first one, then the other. The action of aconite on the *kidneys* has a similar double character, large doses suppress or diminish the secretion of urine, small doses increase it.

Digitalis (the sap of the *Digitalis pupurea*) acts, as is well known, on the *heart;* certain large doses depress the heart's action, and make its beats slower; certain small doses act in the opposite direction, and make its beats stronger and more frequent; and there are intermediate doses which have both actions, one after the other. Digitalis acts on the *kidneys* as aconite does.

Phosphorus also acts upon the *heart;* in large doses causing a small, hard, quick pulse, with throbbing of the carotids; in small doses the pulse is slower, and its force diminished; there are intermediate doses producing effects first in one direction, then in the opposite.

Spigelia (*Spigelia anthelmia*) acts upon the *heart;* from large doses the pulse is irregular, now slow, now quick, falls from 72 to 54, with strong beatings of the heart; in my experiments

with small doses, the pulse was raised from 77 to 84, with a preceding slight fall—the action of an intermediate dose.

Chamomilla (*Matricaria chamomilla*) acts on the *liver;* in the larger doses it diminishes the secretion of bile, as shown in diminished evacuations of a dark colour; in the small doses it increases the secretion of bile.

Veratrum (*Veratrum album*), the favourite but violent purgative of Hippocrates, does not require the repetition of experiments with large doses. In my own experiments with small doses it produced constipation.

Castor oil (*Ricinus communis*). It is universally known that half an ounce of this oil causes purging; *Essay* XXXI. contains an experiment with the hundredth part of a drop, which, taken night and morning for three days, stopped all action of the bowels for five days.

These are a few examples of particular facts; you will not fail to notice that all hypothetical explanations of the causes of these facts, or of the manner in which they are brought about, are rejected. For instance, if a quarter of a drop of a tincture of aconite quickens my heart as much as a whole drop quickens another person's heart, it is not said that my heart is more "sensible" to the action of aconite than my neighbour's; nor that my neighbour's heart has more "resistance" than mine. The phenomena are expressed as so many facts. It is possible to discover general facts or laws of nature without an explanatory hypothesis or theory, as will now be shown.

General Facts or Laws.

"Man," Lord Bacon says, "is the interpreter of nature;" or, in the language of Solomon, "It is the glory of God to conceal a thing, but the honour of man to search it out." This interpretation of nature cannot be successfully searched out in the by-paths of speculation, by spinning cobwebs of learning out of our own brains. It is discovered by *induction*—by the examination of every particular fact in one class of objects at a time, and by observing any special character or property in which they all agree, besides that on account of which they all belong to one class.

Drugs are a class of bodies, all of which are characterised negatively by not being food, nor refreshing beverages; and positively, by acting injuriously, in all doses, on the healthy body of man.

By comparing with each other experiments made upon ourselves in health, with a large number of these drugs, the following general facts or laws respecting them have been discovered:—

I. *Drugs act locally.*—When a dose of a drug has been swallowed, it does not cause a general and uniform disturbance of every part of the body; but it disturbs the healthy life of one or more organs or parts of the body. Each drug may be distinguished from other drugs by the organ or parts, solid or liquid, on which it acts. When the most powerful action of several drugs is upon the same organ, they may be distinguished from each other by the organs on which they have a subordinate action, and by the kind of action of each: *e.g.* aconite and spigelia act on the heart; but aconite acts also on the kidneys, and spigelia on the eyes; and the kind of action on the heart of aconite and spigelia is in opposite directions.

II. *The kind of action is determined by the dose.*—This varies in at least three ways:—1. A certain range of doses of each drug, called larger doses, acts upon the organ or parts in one direction. 2. A certain other range of doses, called smaller doses, acts upon the same organ or parts in the opposite direction. 3. Certain intermediate doses, doses between the large and the small, act in both directions; first in one, then in the contrary manner. With some of these intermediate doses the action of the large dose comes first; with others, that of the small dose.

III. *Drugs intend to act on the same organs and with the same kind of action in disease that they do in health.*

It is probable that another general fact will one day be recognised, namely, that for each drug there is another which has the reverse action:—*e.g.* belladonna and Calabar-bean on the pupil; aconite and spigelia on the heart; opium and belladonna on the brain; perhaps nux vomica and pulsatilla on the stomach, &c.

And, as there are doses, some larger and some smaller than

those hitherto experimented with, which remain to be examined, it is probable that other general facts may be discovered respecting them.

Practical Rules or Laws of Therapeutics.[1]

The practical results of this investigation, which justify the appearance of this paper in the *Practitioner*, are as follow :—

1. The seat and kind of action of each drug must be discovered by experiments upon ourselves and others in *health.*

2. The drug to be given as a remedy must have been found to act in health on the principal *seat* or *seats* of the disease to be treated.

3. The *kind* of action of the larger doses of the drug, when taken in health, must resemble that of the disease ; or at least the drug must have produced similar symptoms.

4. The *dose* given ought to belong to the range of smaller doses, which in health has a contrary action.

5. The drug must be given *alone ;* otherwise its action will be interfered with, if not neutralised.

6. When the desired effect of the medicine has been obtained, it must be *discontinued.*

It will not hurt you to know these things ; neglect, or abuse of them, will not prove them untrue ; and if they are true, an enlightened conscience will tell you that your treatment of the sick should be guided by them. Study facts only ; do not meddle with any theory. Kepler's three grand laws of the motions of the planets were discovered without a theory ; so have these laws of the actions of drugs. Do not accept or invent hypothetical explanations, but follow the example of the most eminent natural philosopher the world has yet been blessed with. After proving the laws of gravitation, Newton says, "Hitherto I have not been able to discover the cause of these

[1] The Editor has already expressed his own views regarding the therapeutic laws here enumerated (Practitioner, vol. xvii. p. 127). As an exception to the general rules given by Dr. Sharp, he would instance nitrite of amyl—of which the seat and kind of action were discovered by experiments on animals—which, in large doses, and in health, has an action directly contrary to that of the disease angina pectoris, in which it is chiefly useful, and which, for the relief of the disease must be given in doses large enough to produce its full physiological effect.

properties of gravity from phenomena, and I frame no hypothesis . . . hypotheses have no place in experimental philosophy. In this philosophy [and surely medicine is, or ought to be, part of this philosophy] particular propositions [called particular facts in this paper] are inferred from the phenomena, and afterwards rendered general by induction . . . . . To us it is enough that gravity does really exist and act according to the laws which we have explained." To physicians it should be enough that the action of drugs, injurious in health and remedial in disease, does really exist; and it is their duty to discover and to be guided by the laws which govern this action.

It cannot be said of the facts mentioned in this paper, or of the details of experiments given in former essays, that they are insignificant. You may think them insufficient; if so, your duty is plain—add to their number by experiments of your own; whatever may be the results, if your experiments are well and honestly done, truth will gain by them. You may think them sufficient, and you may adopt the general facts or laws which seem to have been proved by them; if so, your duty is equally plain—for much work remains to be done: we are very imperfectly acquainted with the drugs which we are daily using, and there are hundreds of plants and minerals of which, as medicines, we know nothing—think of these things and, with that sober enthusiasm which is the characteristic and the honour of your time of life, give yourselves to them; and you shall be benefactors, not only to your own generation, but to those which are to follow.

ON THE USE OF MERCURY IN CERTAIN INFLAMMATIONS.[1]

BY JOHN C. THOROWGOOD, M.D., F.R.C.P.,

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THE attention of physicians was first drawn to the real value and scientific employment of the preparations of mercury by Sir Theodore de Mayerne about the year 1650, and a formula was published for Mayerne's black wash as follows:—

℞ Aquae Calcis ℥ij.
Mellis Rosati ʒij.
Mercurii Dulcis ʒj.—Mix.

With this lotio nigra a wonderful cure was performed on the person of Sir Kenelm Digby, and the remedy acquired celebrity forthwith.

Long anterior, however, to the date just given, mercurial unguents had been in use among the Arabians, and in 1497 Paracelsus treated syphilis by mercurial frictions to the surface of the body. At the close of the last century, Dr. Hamilton published observations on the use of mercury as an antiphlogistic in acute inflammations.

We all know how profusely mercury has been administered in the treatment of syphilis; we have read how the patients in the venereal wards of the hospitals have lain with saliva pouring from their swollen mouths, while the doctors viewed with complacent satisfaction in this fearful salivation the triumphant power of mercury in driving out syphilis. We further know

[1] Read before the West Kent Medico-Chirurgical Society, April 5th, 1878.

how such a reaction in the professional mind followed the abandonment of this baneful practice that thoughtful men have even come to doubt whether mercury was, after all, necessary for the cure of venereal diseases. To enter on the question of mercury in syphilis is not my purpose; but permit me to refer to two cases of syphilitic inflammation and consolidation of the lung treated by perchloride of mercury; for while these cases illustrate the anti-syphilitic action of mercury, they also serve my more immediate purpose by exemplifying the absorbent action of the metal over plastic exudations.

The first case was that of a woman who had been infected with venereal disease by her husband. She had dulness at the left lung apex, slight flattening, and bronchial breath and voice sound. General health fair, and right lung sound. In this case, which I saw in 1873, and have heard of at intervals since, a most striking improvement took place under the influence of small doses of perchloride of mercury, though previously hypophosphite of soda, cod-liver oil, and iron, had been given with but slight benefit.

The second case is recorded by Dr. Walshe, and was that of a man, the right side of whose chest was dull on percussion from below the clavicle to the fourth rib, respiration high-pitched, weak, and free from rhonchus. This man went to the South of France, and then returned to London with unmistakable syphilitic nodes on his cranium, the state of his lung being unchanged. He was put on a course of perchloride of mercury, and the lung so completely recovered that after a while not a particle of difference could be detected in the percussion note on the two sides. Years afterwards he was seen in perfect health.

Here, as in the first case, no amendment took place till mercury was administered, and the cases are worth remembering when we have to do with a persistent chronic deposit in the lung. See in such a case if there be any suspicious skin eruption, or periosteal thickening; if there be, there is a chance for the doctor to get the credit of curing a consumption.

In non-specific inflammations affecting both the air-tubes and cells, as well as the pleural covering of the lungs, I have often had good reason to speak well of the curative value of mercurial remedies.

A certain amount of inflammation, or a slight amount of congestive œdema of the mucous membrane of the air-tubes, causing symptoms of bronchitis, or bronchitic asthma, may be notably relieved by mercury.

Let us reflect for a moment on the expression "congestive œdema of the mucous membrane." We may get œdematous swelling of the mucous membrane of the throat and tonsils, of the air-tubes and air-cells, and of the lining of the intestinal tube—the duodenum, for example, where the œdema tends to obstruct the opening of the bile-ducts and so cause jaundice. Mercurial remedies under all these conditions promote secretion from the small glands, relieve the œdema, and prevent inflammation.

In the early stages of enteric fever, with tenderness and tympanitic distension of the abdomen, Graves of Dublin used to give small doses of mercury to promote secretion from the intestinal glands. The late Dr. Parkes also thought calomel of service in the early stages of enteric fever; and my own belief is that, given cautiously in the commencement of the disease, the mercury may diminish intestinal congestion, and so lessen the chance of hæmorrhage later on in the progress of the case.

There are those who, like Störck and F. Haring, hold that the spasm of asthma is due to an acute swelling of the mucous membrane of the bronchioles.

After what I have said, I may assume such a state of acute œdema of the bronchioles as explaining the remedial action of mercurials in certain cases of asthma where the spasmodic element is in excess of the inflammatory, and where we might not at first think mercury likely to be worth a trial. Here is a case in illustration:—

On November 7th, 1872, Charles B., a carpenter, aged 27 years, born of healthy parents, came to Victoria Park Hospital. He has had one or two attacks of bronchitis, and spits scanty frothy sputa, but at night, or rather about 3 A.M., he often has sudden severe attacks of asthma of great severity—he has to leap out of bed and get to the window for air. When undressed for examination he had a severe fit, sat with hands resting on the table, sweat pouring off him; pulse 110; respiration 60 per minute; and I had to use chloroform before he got any relief.

That night, when at home, he thought he should have died in a fit of asthma. Nothing very remarkable in form of chest; throat noted as tumid and congested. Expiration prolonged, with sonorous and sibilant wheeze. Ammonia with iodide of ammonium did no good, indeed he said it made him worse. Ordinary expectorant and antispasmodic mixtures with stramonium likewise failed, but a mixture containing hydrocyanic acid, morphia, and spirit of chloroform, was invaluable during the attack of spasm.

Dec. 12th. He was ordered every night a pill composed of Pil. Hydrargyri, Pulv. Scillæ āā gr. ij., and a mixture in the daytime of bromide of ammonium and belladonna.

19th. He declares he has had no attack at night since taking the pills; to use his own words, "he rests first rate."

His letter being out he disappeared for a short time, but on January 3rd, 1873, he came again with fresh attack of cough and return of asthma. He begged to have some more of the last pills, and they were accordingly given, together with a Senega mixture.

Jan. 9th. He said the pill at night had soon given him ease, but he would prefer not to take the mixture as he felt no benefit from it. Early in February he was discharged much relieved, and has not been seen or heard of since.

Here was a case of most severe spasmodic asthma, with some underlying bronchitis and scanty secretion from the air-tubes, cured by mercury after various other medicines had been unsuccessfully tried.

Case II.—In this case the symptoms were urgent from the bronchial congestion and obstructed circulation.

Alfred P., aged 27, admitted to Victoria Park Hospital October 30th, 1873. He has suffered for some months with chronic bronchitis, and now as he stands up his dyspnœa is most urgent, respirations 56 in the minute, and sweat pours off him. There is no percussion dulness, very prolonged harsh expiration audible all over chest.

Nov. 20th. Subcrepitant rales audible over bases, and a systolic murmur made out at cardiac apex audible behind at inferior angle of scapula. Stramonium and ether having failed to relieve the breath difficulty, a pill was given every night of

Pil. Hydrargyri, Pulv. Digitalis, Pulv. Scillæ āā gr. ij., and after a few nights he could rest with a degree of comfort he had not known for months. The complication here of the heart mischief precluded more than partial relief, but even this was a great gain. In both of these cases I believe the pilula hydrargyri acted in reducing the congestion and hyperæmia of the bronchial mucous membrane; secretion became more free, and the current of the blood in the capillaries flowed along more readily.

In cases of persistent chronic bronchitis, with inflammatory condition of smaller air-tubes, the connective tissue around the blood-vessels increases, while the air-cells themselves atrophy and waste away; or these cells may become filled with swollen pigmented epithelium, as in brown induration of the lung. Either condition is one by which the lung function is most seriously and irreparably damaged; hence the great importance of seeking to prevent the continuance of a troublesome bronchitis, and procuring the speedy absorption of whatever kind of exudation may have already taken place from the congested vessels. It is for the promotion of this end that I claim for the preparations of mercury a place that cannot be supplied by any other medicine.

Case III.—Henry S., of Enfield, aged 40, hospital out-patient. This man, of healthy aspect, though rather dusky and congested about lips, has had a very bad dry hard cough for the last month. At night his cough is most severe, and his difficulty of breathing great, and no remedy as yet tried has done any good. Pulse 84, urine turbid with lithates, sonorous and sibilant wheezings about chest. December 29th, 1877, he was ordered a mixture containing vinum ipecac. and hypophosphite of potash, and on January 5, 1878, he was again seen, in no way improved. Ordered now Pilulæ Hydrargyri, Pulveris Scillæ āā gr. ij. every night. He took these pills up to January 13th, when he declared himself perfectly free from cough, and able to be discharged.

Case IV.—Mrs. J., aged 34, for months has had a very severe cough every night, has to sit up from 10 P.M. to 4 A.M. coughing and spitting. Pulse 130, tongue clean, sonorous rales and prolonged expiration all over chest, urine loaded with lithates.

Ordered Pilulæ Hydrargyri, Pulveris Scillæ āā gr. ij every night. Ipecacuan saline mixture three times daily. Having taken the pills and mixture for one week she came on November 3, 1877, stating that the last two nights she had been able to lie down easily, "not near so much spit." Pulse 96, urine clearer. November 24th she was let go cured.

It would not be difficult to add to the list of cases of persistent bronchitis much relieved or quite cured by mercuric medication. A review of the cases recorded leads me to select as likely to be benefited by a course of Pil. Hydrargyri those where there appear as prominent symptoms a severe cough, coming on especially at night, feverish tendency with loaded urine, shortness of breath, some lividity of lips, and perhaps some impairment of resonance at the bases of the lungs indicative of congestion ; expectoration usually scanty and difficult to raise.[1] The patients are rarely advanced in life, and I find that in the chronic bronchitis of old persons with atrophous emphysema of the lungs, and wasted thin-walled air-cells, mercury is prejudicial rather than good. The time for its employment has passed.

In cases of bronchitis complicated with a true tubercular softening of the lung, and much purulent expectoration, or in any case complicated with persistent albuminuria, mercurial remedies are more likely to do harm than good.

In catarrhal bronchitis tending to pneumonia, with blocking up of air-cells and consolidation of lung, I believe we may employ mercury without fear. Not long since, I attended the two children of a professional friend, both of whom had rather severe bronchitis, and in the elder the temperature ran to 105° while dulness at the bases, chiefly right, with crepitation and bronchial breathing, made us believe a pneumonia had developed. Frictions with oleate of mercury very speedily dispersed this dulness, and the child recovered with much more rapidity than I had predicted or expected.

It seems to me to have been in such cases as these where Graves, Marsh, and the late Dr. Stokes of Dublin thought highly of mercury. "When," says Graves (1843) "a scrofulous inflamma-

[1] The use of mercury in persistent bronchitis was much commended by the late Dr. Theophilus Thompson. I cannot at present find the date of his experience.

tion of the lung has arisen suddenly and in consequence of some obvious cause, such as taking cold or the occurrence of hæmoptysis, then in such cases of commencing phthisis, and in such only, mercury may be employed with advantage." Many years ago Dr. Munk of London, and Dr. Rush of America, wrote in testimony of the value of mercury in dispersing these deposits in the lung, which, if unabsorbed, appear likely to break down, destroy lung structure, and so cause phthisis.

In inflammation of the serous membranes of the chest, mercurials I believe are not now employed so freely as they deserve to be, certainly not so freely as they were years ago. In illustration of practice nearly forty years ago allow me to quote an article by the late Dr. James Hope, of St. George's Hospital. The paper from which I quote, published in the *Medico-Chirurgical Review* of July 1841, p. 295, was one dictated by Dr. Hope when on his death-bed, and it was completed only four days before he died. The talented author begins by lamenting the want of success that attends the treatment of empyema. "Dr. Law's treatment comes nearer to that which I have found effectual, but he is too timid in giving mercury, from fear of its inducing irritating fever and hectic." Hope goes on to say, "I have steadily continued the gentle external use of mercury through the most violent hectic coming on twice a day in tremendous paroxysms, while I have counteracted this by strong broths and plenty of animal food."

Hope then notices that he has cured thirty-five cases consecutively during the last four years. One of these cases is especially dwelt upon, that of Sir Clifford Constable's coachman. This man was seen after he had been ill with acute pleurisy for three weeks; the chest was emptied in a week, but the mercury ordered to be continued. This direction was not complied with, and in ten days Hope was again called in and found the chest had refilled, while the patient had a violent hectic paroxysm twice daily; his pulse was 150. "In all this," says Hope, "I saw nothing but a large quantity of pus in the circulation, which nature was endeavouring to throw off in the usual way. I therefore continued the mercury and blisters in moderation, and made free use of the mineral acids, which he bore well, while he fed freely on beef and mutton." Under this

treatment the chest was emptied in ten days, the hectic symptoms slowly gave way, and in six weeks time the man was sent into the country, taking iron and dilute sulphuric acid, and being fully convalescent. Hope states that he found by experience that it was best to stop the mercury as soon as the slightest sign of its action on the mouth and gums became manifest.

In the early stages of pleuritic inflammation, with signs of fibrinous or serous effusion, quick pulse and elevated temperature, I have found prompt and decided benefit from the use of the pill of mercury with squill night and morning, while a mercurial unguent has been applied to the side of the chest. Recently I have been using the oleate of mercury, made by Martindale, and have proved it an active and valuable application if used cautiously and in small quantities each time. I have never but once observed any decided action of the mercurial on the mouth. That once was in the case of a man who was seriously ill with pleurisy in Victoria Park Hospital. He had been rather freely blistered, and I had him anointed over the blister with mercurial ointment. A slight degree of ptyalism was noted, but the recovery was speedy and satisfactory.

The inflammatory process in a serous membrane, like the pleura, commences, as it does in a mucous membrane, like that of the bronchi, by hyperæmia, exudation of liquor sanguinis and emigration of blood corpuscles through the walls of the vessels, with later on alterations in the nutrition of the inflamed tissue. The remedial action of mercury lies in its diminishing the hyperæmia and congestion, and checking the subsequent exudation by aiding the onward flow of blood in the capillaries, and so preventing the inflammatory stasis.

Provided things have not gone so far as to have induced any important nutritive changes, as the inflammatory stasis passes away, absorption of effused products takes places, but no absorption will commence while inflammatory stasis persists. It appears to me that in pleurisy, as soon as the pulse begins to fall and temperature to become normal, then absorption of effusion may be looked for, and mercurial medicines may be laid aside, while we look to iodine preparations and blisters as the means to help forward the absorbing process.

Of the excellent effects produced by the internal use of the subchloride of mercury—"fracta dosi"—in very severe peritonitis with constant vomiting, tympanitic abdomen, and tongue black with sordes, I have had good experience, but I do not wish here to enter on the subject of the treatment of peritonitis. I may, however, in illustration of my object in bringing the subject of the use of mercury in certain inflammations before the Society, incidentally allude to the case of a railway signalman who was brought into the West London Hospital last December, in intense pain, due to intestinal obstruction. We gave him opium and various enemata, and my surgical colleagues and I began to think whether an exploratory incision might not be required. However, after several doses of extract of belladonna the bowels acted freely and frequently, and then came on an attack of true peritonitis, breathing entirely thoracic, face most distressed, pulse quick and tense. The treatment of this state consisted in calomel and opium, and I was struck with a remark made on the case by one of my colleagues; he said, "I am glad to see you are one of those who *still* believe in calomel and opium." The patient made a slow recovery, but is now up and about. For some time we were able to trace acutely tender thickenings, or depositions beneath the abdominal parietes, near the seat of the presumed obstruction. These have now entirely dispersed.

It is to the value of mercurial medicines in dispersing congestion and promoting the absorption of exudations and deposits, that I wish to invite the attention of our Society. That the mineral must have been in past years often given far too profusely and without due judgment is a fact I do not doubt, and by it I should explain the unmistakable prejudice so often found in the public mind against calomel and blue pill; but because the drug has been thus abused is not a reason for discarding it from our practice, at any rate not before we have carefully considered how it may be prejudicial, and what cautions are necessary in its employment. Salts of mercury defibrinate the blood and destroy the red corpuscles. Dr. Farre gave a ruddy plethoric woman mercury for six weeks, and at the end of that time had blanched her as white as a lily.

There is abundant evidence of the power of mercury to dissolve and disintegrate recent exudations of low vitality, and by accomplishing this object most damaging structural change in organs may be averted.

To persons whose tissues naturally are poorly nourished and of low vitality mercury, if given, must be carefully watched as to the effect it produces. A strumous habit does not forbid the employment of mercury unless the patient be of a very weak, ill-nourished constitution.

The curative powers of mercury are best displayed in persons of robust habit, not advanced in years, and who chance to be attacked with an exudative or congestive inflammation attended with fever, loaded urine, and obstinately persistent against ordinary remedies.

Alcalies, as a rule, accord better with all forms of mercury than do acids; and, always before giving a person any form of mercury, heed should be paid to anything said as to idiosyncrasy against the remedy, neglect on this point having led to singular but unfortunate results.

AUSTRALASIA, SOUTH AFRICA AND SOUTH AMERICA AS HEALTH RESORTS, COMPRISING A MEDICAL CLIMATOLOGY OF THE SOUTHERN HEMISPHERE.

BY C. FABER, M.D., OF STUTTGART,

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(*Continued from p.* 30.)

The Climate of the Continent of Australia.

THERE are many highly educated and even scientific people who have a strong distaste for figures. Statistical tables filled with the most valuable and laboriously compiled data are turned over by them without even so much as a cursory glance, or, at most, the abstracts at their foot are read. Yet there are, unfortunately, certain subjects, of which climatology is one, where figures form the most essential part, and therefore cannot well be spared to the reader.

Applying this to medical climatology, of which I am writing, it may satisfy the average invalid who does not pretend to think for himself, to know that the place he is sent to for his health has a dry or a wet climate, a warm equable one, or one subject to great and sudden changes against which he has to be on his guard so as not to be injured by them, but to profit from their bracing effect. But neither the physician, who takes upon himself the responsibility of sending an invalid far away from home for his health, nor climatologists, for both of whom I am writing, will rest satisfied with such vague and general descriptions; they require as many positive data regarding the meteorology of a place as they can get, so as to be able to judge for them-

selves, and in the case of the former, to adapt the climatic treatment to the individual case.

In order to satisfy them both and, at the same time, to make this description less monotonous by taking a more general view of the subject, I shall consider each of the meteorological components by itself, in its continuity, instead of giving all the meteorological data for each station together. This method has the disadvantage that the reader has to gather the data from several headings in order to know the climate of a certain place, but this is nothing compared to the advantage it possesses of giving a knowledge of the general character of the climate of the whole continent as well as of its different parts.

This is, as far as I know, the first attempt ever made to write a general climatology of Australia.

My sources have been—the latest official reports I could get,—and for which I have already expressed my thanks to the Agents-general for the different Australian colonies at London,—and extracts from reports and other papers of older date, and by various authors, which I have found in the *Vienna Meteorological Journal*, 1866—1877. In the latter the original English measures, degrees of Fahrenheit and inches, have been converted into those of the metric system, so that I had to reconvert them. In doing this I have rounded off the fractions where they did not appear of any importance, especially in the case of rainfall, for which, considering its great irregularity in Australia, the time of observation at most of the stations is too short for fractions of an inch to be of any moment.

I have thought it instructive for such of my readers as are little versed in climatology to give the corresponding meteorological data of Greenwich Observatory as the best, most popular, and generally known standard of comparison.[1]

[1] I owe these to the kindness of Sir George Airy, who, through Mr. W. Ellis, to whom also my best thanks are due, sent me a valuable table of the meteorological observations made at Greenwich during the last thirty-five years, 1841–1875. Also to Mr. Robert Scott, director of the London Observatory, I feel bound to tender my sincere thanks for sending me, beside other valuable papers, the *Annual Means of Thirteen Years' Observations at London*, compiled by Mr. R. Strachan. As these reports do not, however, give the ranges which are of special interest from a medico-climatological point of view, and do not extend over nearly so long a period as the Greenwich observations, I have confined myself to citing the latter.

There is no other continent where the two contrary climates, sea and desert climate, stand in such marked contrast to each other as in the case of the Australian continent. It may be said to constitute a great meteorological disturbance in the middle of that vast, almost uninterrupted expanse of ocean that stretches between the east coast of Africa and the west coast of South America. The climate of Australia, therefore, might be characterised as the resultant of those two contrary factors, of which, however, the desert climate is predominant.

To understand their action upon each other it is necessary first to characterise them severally.

The southern hemisphere as a whole possesses a pre-eminently oceanic character in regard to geography and climate. The area covered by land is small compared with that occupied by ocean. The climate, consequently, is, on a whole, oceanic, *i.e.*, moist and equable ; summer is cooler, winter warmer, than in corresponding latitudes in the northern hemisphere. The higher mean temperature in winter does not, however, quite compensate for the deficiency in summer. The temperature of the southern hemisphere is, therefore, lower than that of the northern one. Thus the difference in the mean annual temperature in favour of the latter has been computed to amount to 1·6° F. in latitude 10° ; to 3·3° F. in latitude 20° ; to 2·9° F. in latitude 30° ; and to 2° F. in latitude 40°.

This difference has been explained in different ways ; by the greater length of the summer in our hemisphere ; by the greater amount of heat it receives from the stars, our sky being more studded with them than that of the southern hemisphere, &c. But these are of secondary importance, the chief point being the difference in the relative distribution of land and water on either hemisphere. The amount of heat the earth's surface receives from the sun is about the same in both ; but in the first place insolation is less on the southern hemisphere, the atmosphere there being on the whole moister ; in the second place, the amount of irradiation is vastly different on either. The land gives back a much larger proportion of the heat received from the sun to the air than the sea does ; the processes of evaporation, and, in high latitudes, of melting of the ice, "binding," as it is called, a considerable amount of heat.

The best idea of the climate of the Southern Ocean may be given by a few illustrations.

Captain Musgrave, of the *Grafton*, when cast away for twenty months on the "Auckland Isles," to the south of New Zealand, in 50° 30′ S. lat., *i.e.*, one degree nearer the equator than London, compares the weather of the most severe winter month there to April weather in England. The lowest temperature ever observed was 22° F.; the highest in winter 52°. On the other hand, the maximum in summer was only 8° higher than the latter, viz., 60°; and in either case it was produced by a warm N.N.W. wind, which is supposed to be one and the same with the hot wind of Australia. The ordinary temperature at noon was in summer not higher than from 43° to 52° F. Even ice was observed, and rain showers were more frequent in summer than in winter, so that spring and autumn appeared preferable to summer. Equable to an extreme, as the temperature is, great changeability of the weather is the other characteristic of this climate.

In nearly the same latitude as that of the Auckland Islands and of Greenwich, lie on the southern hemisphere, to the east of Magellan's Straits, the Falkland Islands. The mean temperature of the year there is 47°; at Greenwich 49·4°; of the coldest month it is 37·5°—Greenwich 38·5°; of the warmest 55° against 62° at Greenwich. It must be remembered that the latter place has itself a climate of oceanic character, not only from its insular position, but also in consequence of the Gulf Stream, thanks to which the climate of the British Isles is to a great extent uninfluenced by that of the continent, and in particular by that of Russia.

Even as far south as 63° lat. the lowest temperature during thirteen years shown by a thermometer deposited on one of the Shetland Islands by Foster in 1829, and taken up in 1842 by Captain Smiley, was only 5° F., *i.e.*, not lower than the minimum temperatures observed in the south of France and the north of Italy; whilst in certain places in the corresponding latitude of the northern hemisphere—Fort Reliance, N.A., and Takutzk, in Siberia—temperatures of −70° and −73° F. respectively have been observed. Yet, in spite of their mild climate, those islands are constantly covered with snow, and so powerless are the sun's

rays there, that only in a few limited localities will the snow melt, and some poor vegetation appear in midsummer. In Spitzbergen, at a much higher latitude (80° N. lat.), the Swedish expedition in 1861 found the snow line to have receded to above 1,000 feet, being followed up by vegetation. Greenland is inhabited by Eskimos up to 78° lat. We therefore need not envy the Southern Ocean for its exquisitely equable, but extremely dull climate. One gets a pretty good idea of the latter in sailing, as I have done, from Australia through the South Pacific, round Cape Horn, as described in the first of my medico-nautical papers—"On the Influence of Sea Voyages on the Human Body, and their value in the Treatment of Consumption. Chapter I. On Sea-climates."—*Practitioner*, March, 1876.

Now there is in that vast southern ocean a compact continent, for the most part covered with *desert*, which in the warm season is heated by a tropical sun like a furnace. Insolation is there at its maximum, for several reasons, of which the two principal ones appear to me to lie, the one in the condition of the surface of the desert, the other in that of its atmosphere. The former is not covered with any vegetation to speak of, but mostly consists of barren rock or sand, at least in the hot season when what there was of vegetation is all withered. Dry, barren soil, particularly that consisting of sand, is of all surfaces heated most quickly and intensely.

The sun is rarely covered by clouds. Sturt narrates that he could not discover even the smallest cloud for three whole months! Altogether the air is very dry, especially in summer. The drier the surrounding atmosphere, the more intense is insolation; but on the other hand the surface and the air of deserts cool down, at night when the sky is clear, proportionately quickly and intensely. A moist atmosphere may, with regard to the surface it covers, be compared in its thermic effects to a cloak which covers a human body. Each of them has the effect of diminishing insolation as well as irradiation.

In the desert there may be the most intense heat that is to be found on earth in the day time, and ice at night. In the Australian desert, however, the daily as well as the yearly variation of temperature appears to be much less than in the African, and still more in the Central Asian, deserts. This, no

doubt, is due to the oceanic character of the southern hemisphere, together with the smallness of the continent.

Sturt, the first brave explorer of the central desert, gives a vivid illustration of its climate. To the east of Lake Torrens, in lat. 29° to 30°, he observed temperatures, in the shade, of 130° and more. The whole vegetation was perfectly withered and dried up into dust. The earth was cracked into chasms from eight to ten feet deep, and one foot wide. The screws of the instruments got loose and fell off; the horn of knife-handles and combs split up into thin laminæ; the leather on the shoes shrivelled up in touching the hot soil, and matches took fire as soon as they were held against it. The cattle lay motionless and drowsy. The hair of the people and the wool of the sheep ceased to grow. Finger-nails got brittle like glass. Flour lost more than eight per cent. of its weight. Lard and wax candles melted away. A thermometer with a scale up to 127° burst. Writing became an impossibility, the ink drying up in the same moment the pen was filled. There was no rain from December 1844 till July 1845, except a few drops that fell in May. In July, generally the coldest month in the southern hemisphere, the lowest temperature observed was 23° F. The changes of temperature in the desert sometimes amounted to 70° or 80° F.

It is to the desert that the Australian colonies, as far as they come into account as health resorts, owe their *warm, dry,* and *stimulating* climate; but on the same cause also depends in the first place its great *variability* and *irregularity,* particularly as regards the rainfall. On the other hand it is due to the vast surrounding ocean, that in spite of the last-named characteristics, there is—comparatively speaking—a remarkable equability of temperature, in other words comparatively small ranges of temperature, which mainly is accounted for by the summer being cooler than in places of the same latitude in our hemisphere, at least in those on the Mediterranean, which are the best known, and of special interest to the medical climatologist. A few instances will show this:—

	Latitude.	Mean temperature of Year.	Summer.	Winter.	Difference between Summer & Winter.
1. Sydney ...	33° 51′ S. ...	62·5° F. ...	70·9° F. ...	54·1° F. ...	16·8° F.
2. Beirut ...	33° 50′ N. ...	69·3° F. ...	79·7° F. ...	56·3° F. ...	23·4° F.
1. Melbourne ...	37° 50′ S. ...	57·6° F. ...	65·3° F. ...	49·2° F. ...	16·1° F.
2. Athens ...	37° 58′ N. ...	64·7° F. ...	81° F. ...	48·7° F. ...	32·3° F.

It must, however, be remembered that the Mediterranean is a land-locked sea, and has to the south of it large and hot deserts, the African and the Arabian. Its climate, therefore, is not in all respects a good standard of comparison, the influence of the desert prevailing much more over that of the sea than is the case with the Australian coast-places. If we take places on the Atlantic, Lisbon, for instance, which is scarcely one degree nearer the pole than Melbourne, the difference in the range of mean temperatures of summer and winter will be seen to be considerably less than at the Mediterranean places in the above table; the corresponding figures for Lisbon being: 61·5° mean annual temperature, 71° mean summer, 52·5° mean winter temperature, which makes a difference of 18·5°, or about two degrees more than at Sydney and Melbourne.

If the character of the Australian climate depended on the desert only it would be something like that of Central Asia, with its extremely hot summers and bitterly cold winters. If, on the contrary, it depended on the surrounding ocean and the mountain-ranges on the east coast, which keep to a large extent the rain off the interior, and therefore the central desert were absent, Australia would be covered all over with rank vegetation, like South America, or the "fern-country," New Zealand. But at the same time the Australian climate would lose its eminently stimulating properties, and with them the Australian people would lose that restless activity and ever-pushing energy to which the Australian Colonies, extremely young though they are, owe their wonderful progress. This, I think, is a point which should reconcile them to their vast desert, though the latter leaves them only a narrow strip of country along the coast fit for cultivation.

As it is, the two contrary climates keep one another in check as it were. At times, however, one of them, generally the desert climate, gets the upper hand. Thus we shall, later on, see the noted hot wind break forth from the interior with terrible force and effect; and, on the other hand, the "southerly brushes" break in. It is this grand struggle of two climates which adds considerably to their variability and irregularity, which is a characteristic of the desert climate.

The latter manifests itself more or less according to locality.

If we compare, in this respect, the three principal places of the Australian Continent, viz., Sydney, Melbourne, and Adelaide, this same order of increasing intensity is observed. Sydney being on one side sheltered by the Blue Mountains against the desert, and on the other side exposed to the easterly breezes from the Pacific, has the most equable climate, whilst Adelaide is most exposed to and under the influence of the desert.

Irregular and changeable as the weather is in one and the same place, so the difference is remarkable which it shows at the same time in different places. Very commonly floods in the coast districts are simultaneous with droughts in the interior, beyond the dividing range.

Also along the coast that difference is very marked. In this respect Sir G. S. Kingston, whose valuble observations on the meteorology of South Australia, Adelaide, extend backwards over a period of more than thirty years, has the following remark: "The telegraph constantly informs us of changes of weather, heavy rains and gales of wind, to-day at Sydney, and another time in Melbourne, the weather here being perfectly dry and calm, and no corresponding change taking place here, even after the lapse of many days."

Speaking of the telegraph, I may mention that the three colonies, New South Wales, Victoria, and South Australia, have not only an inter-colonial system of telegraphic weather reports, but also daily weather charts which, as in London, appear in the principal daily papers.

The remarkable difference we have seen to exist in the character of the weather in different localities at the same time may be explained in different ways.

The more moisture the sea-breezes have lost in the coast districts, and on the dividing range, the less do they bring inland with them.

Then, as Mr. Russell, of Sydney, a most careful and learned observer of the Australian climate, points out, the weather, and in particular the rainfall, is different according as the trade-winds and north-west monsoons, are weaker or stronger, and therefore their margin, which is the region of rain precipitation, comes to be in this or that latitude. "If this, the margin, is pushed to the south of us, we have dry winds here and an extra rainfall

on the south coast; and if the trade-wind is weaker, we are in the rain region, and have abundance of it."

Last, not least, the central position of the Australian desert, that great source of meteorological disturbance, must be kept in mind, together with the climatic antagonism it bears to the surrounding ocean. The outbursts, so to say, from the former as well as the inroads from the latter, therefore, will be in the direction of a radius at this or that point of the circumference, *i.e.*, the sea-coast. Each outburst may attain a width of hundreds of miles; the hot wind has been observed to extend over 800 miles of the sea-coast at a time.

Although the period of observation in those new countries is far too short to allow of any definite conclusions, there seems to be a certain rule at the bottom of the irregularity of the Australian weather, particularly with regard to air-temperature and rainfall, such as, for instance, a nineteen years' cycle, which would coincide with the period in which the moon runs through all its course, and which is advocated by Mr. Russell. From historical studies going back as far as the first year of colonization (1787), he tries to prove that for each year its character repeats itself every nineteenth year, and he remarks that the Brisbane rain-curve follows Sydney very well, whilst Melborne is sometimes with Sydney, sometimes with Adelaide. The curve of the latter, if *inverted*, agrees very closely with that for Sydney, in other words, the rain seasons of the two places are opposite to each other, except when there is a general drought. Thus, twenty-five years out of thirty-three, the rain-curve of Adelaide is the reverse of Sydney.

As regards the air-temperature, there are also instances of a certain periodicity, though not congruent with any of those hypothetical cycles. At Brisbane, Queensland, the mean annual air-temperature was in :—

1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.
70·9°	70·3°	69·7°	69·4°	69·2°	69·5°	69·9°	70·1°

We have here a gradual descent and ascent. Whether succeeding years will follow this rule or not, remains to be seen. At Sydney a similar course of the mean annual temperature has been observed. From 1854, when it was 59·8°, there was a

gradual rise at the rate of one degree in three years up to 1867, when it amounted to 64·3°, thence there was falling off until 1871, when it began to increase again.

Now I think we are sufficiently prepared to enter into an analysis of the different components of the Australian climate. For this purpose I have, however, first to divide the continent of Australia into four distinct climatic regions :—

1. *Tropical Australia*—by which term I do not understand the whole area that lies within the tropics, and which is about four-tenths of the whole continent, but only its north coast, in particular those peninsulas which on either side close in the Gulf of Carpentaria, viz., York Peninsula and the Northern territory of South Australia, countries with a regular tropical, *i.e.* a hot and moist climate.

2. The *Coast* and *Coast-districts* of the remaining portion of, or of *sub-tropical, Australia,* comprising parts of the colonies of Queensland, New South Wales, Victoria as far inland as the foot of the dividing range, of South Australia and Western Australia.

3. The *Mountain* and *Table-land* districts of those colonies, except the last named, where I do not think any observations from the coast range have been published. This, called the Darling Range, has its highest elevations, Mount William and Mount Keahs, 3,600 feet above the sea, in the south-west corner of the continent. Also the mountain ranges of South Australia, which have their course vertical, or not parallel with the sea-coast, do not rise much above 3,000 feet. The Dividing Range of the remaining three colonies reaches its greatest height in the Australian Alps, in the south-east corner of the continent, where Mount Kosciuszko, 7,200 feet above the sea, is the highest known mountain in Australia. The table-lands that stretch out from the western watershed of the eastern coast range are, in the colony of New South Wales, from two to three thousand feet above the sea.

4. *Central Australia,* consisting to a large extent of plains partly undulating, partly quite flat, "like a great ocean spread out for hundreds of miles on all sides." Their elevation above the sea is, in the colony of New South Wales, from 400 to 500 feet. It quite depends on the season or rather the rainfall which

in those regions is not only scarce, but also irregular, whether those plains appear as desert, or as verdant but treeless prairie, with numerous rivers, swamps and lakes. The one condition changes into the other with a rapidity that is marvellous, as I myself have witnessed. After one of those torrents of rain which usually follow or interrupt a period of drought, the country that until then presented the most desolate aspect, with all the vegetation withered into dust, is changed into splendid pasture land.

From this temporary desert, as it may be called, and which at times of severe and long-continued drought may extend right to the sea-coast, the permanent, or desert proper, has to be distinguished. Here the soil either consists of barren sand or rock which moreover may, as far as the eye can see, be covered with salt incrustations, or, at the outskirts of this desert it is covered with,' what is still worse for the traveller, impenetrable scrub, with the terrible Spinifore, " which twice sent back " so intrepid an explorer as Stuart from near his goal, the north coast of the continent. On the third hard attempt he reached it, as the first that ever penetrated right through the whole continent from south to north.

Not all parts of Central Australia are flat, but it is intersected in various directions by mountain ranges, of which the Mac-Donnell Range, under the tropic of Capricorn, appears to be a watershed between the northern and southern ocean.

I have thought fit to take Central and Tropical Australia into consideration, though at first sight they do not seem to lie within my purpose, which is the medical climatology of Australia. Yet a knowledge of their climate is, apart from the general scientific interest it possesses, indispensable for a proper understanding of the climatology of that comparatively small portion of the continent where until now invalids were sent by their medical advisers, or went on their own account. Without that knowledge one would be in about the same position as if one were going to study the circulation of the blood without any knowledge of the part the heart has in it.

Besides, one cannot know if the Australian desert will not at some, perhaps not far distant time, be found eligible, as the African already has been, for the erection of Sanatoria.

Already the number of invalids is not inconsiderable, and will no doubt steadily increase in the future; there are those who will go into the far interior and return with their health wonderfully restored by the splendid climate, together with the free, though rough bush-life.

Foremost among the different components of any climate stands the temperature. We therefore in the first place have to consider:—

I. The Air-Temperature of the Australian Continent.

1. *Tropical Australia* has a remarkably high air-temperature. If I may be allowed to draw a geographical parallel, it would be with the north coast of South America. The Malay Sea and archipelago would then correspond to the Caribbean Sea and its archipelago, the Antilles. This parallel holds good also for their climatic condition; both have a very hot and moist climate, in consequence of their low latitudes together with their shut-in seas.

Going from west to east, there is first Port Darwin, in 12° 27′ S. lat., 131° 52′ E. long.; the end station of the overland telegraph, a great work, considering the physical, in particular the climatic difficulties, that have been, and still are to be, overcome; but a work which will be greatly surpassed by a railway along the same route right through the continent, from South Australia (Adelaide), to its northern territory (Port Darwin), a stupendous idea, of which the present governor of that colony is an eloquent advocate.

The mean annual temperature at Port Darwin in the years 1869–75 was a little above 82°—in summer 84·7°, in winter 77·7°, or, as these seasons might be more opportunely called, in the hottest and coolest season; for there are really only two seasons in the year: the hot or rainy season, with a maximum temperature in the shade of from 95° to 96·5°, and the cool and dry season, with a minimum of 55·5°. The mean temperature of the hottest month, December, is 89°; of the coolest, July, [illegible]. At Port Dundas, in 11° 25′ S. lat.—one year's observation, taken six times a day—the mean temperature of the year is 80°, the

range of temperature of the two extreme quarters 8·5°. For Coburg Peninsula, in 11° 5′ S. lat.—one and a half year's observation—the corresponding figures are 82·6° and 6° respectively. Sweers Island, situate in the southernmost recess of the Gulf of Carpentaria, in 17° S. lat.—one year's observation—the mean temperature of the year is 80°, of the hottest quarter 84·5°, of the coolest 72.

Somerset, on Cape York, the most northern station on the Australian continent, in 10° 44′ S. lat.—two years observations—has a mean annual temperature of nearly 80°, a mean daily variation of 8·6°, and a mean monthly range of temperature of about 30°. It appears remarkable that Somerset has the same or even a somewhat lower mean temperature than Sweers Island, which is about 7° nearer the pole. This is explained by their different geographical position, Sweers Island lying in the hot Carpentaria Gulf, Somerset on the east side of Cape York, and therefore exposed to cooling breezes from the Pacific.

Port Denison, on the east coast, in lat. 20° S., has a mean temperature of 73°·5°. On the west coast, only a little more to the south, lies Nickol Bay, where Gregory during the five coolest months of the year, May to October, observed a maximum temperature of 92° in the shade, 178° in the sun, and a minimum of 54°—the former in October, the latter in August.

2. *Air-temperature at Coast and Coast-District Stations of Sub-Tropical Australia.*

At Brisbane, the capital of *Queensland*, in lat. 27° 28′, the mean temperature of eight years up to 1875 is about 70°—of summer, 78°; of winter, 60·5°. The ranges of temperature, a point of special importance in a medico-climatological respect, were, in 1875 (a year, however, which was remarkable for considerable extremes)—yearly range, 67°, viz., from 37.5° to 104·5°; mean daily range for the year, 21·4°; in summer. 19·2°; in winter, 22·9°; *i.e.* in winter greater than in summer. The extremes of the daily range of temperature were 40 which occurred in October, and 4° in July.

The Colony of New South Wales takes, under the able direction of the Government astronomer, Mr. Russell, a high place as regards meteorological observations, and for this reason, together

with its being by nature, of all the Australian Colonies, most distinctly divided into those three zones, coast, mountain, and inland, it serves as the best paradigm for illustrating their several climates. It therefore is, I think, quite appropriate to describe them more specially than is necessary with the other colonies.

New South Wales is covered with meteorological stations, over fifty in number, which extend as far as 640 miles inland. The latter, *i.e.*, the inland stations, are of peculiar interest, not only to the climatologists at large, as they give a key to the meteorology of the vast interior, and thereby to that of the continent in general, but also to the medical man who pays the attention due to that great remedial agency—climate. I hope on the basis of those latest, and of some other observations, to give a pretty accurate idea of the climate of the interior, which before this, but hitherto almost solely on empiric grounds, has been strongly recommended to invalids, especially consumptive, as possessing, by its stimulating and alterative properties, a most remarkable reparative power.

First, however, the two forelying zones have to be described, and next the coast-line has to be followed all round the continent as far as its climate has been made known.

The *Coast of New South Wales* extends over nine degrees—28° to 37° lat. S.—of latitude; it looks nearly right towards the east, and is therefore under the full sway of the Pacific, which sends a warm current southward along the coast, with a velocity of from one to two miles per hour. It is to this influence, together with that high and steep wall the coast ranges form against the interior, that the coast of New South Wales owes its remarkably *equable climate.*

The mean annual temperature of the six coast-stations I took note of, and which are pretty equally divided along the whole line, viz. Port Macquarie, Newcastle, Sydney, Wollongong, Cape St. George, and Eden, does not vary much, viz. from 64° at Newcastle to 60° degrees at Eden, the southernmost point of the New South Wales coast, in 37° lat. Newcastle has also the highest mean maximum during the hottest month—January, —84°; Eden the lowest, 77°. At Greenwich it is 85·7°! The mean minimum temperature of the coldest month—July—is

highest at the northernmost station, Port Macquarie, viz. 46·8°. Richmond River, in 28° 50′ lat., *i.e.* not far from the frontiers of Queensland, with a mean annual temperature of nearly 70°, is not on the present official list of stations. Eden again comes last, with 43·7°. At Greenwich it is 21·6°. The difference, therefore, between the extreme stations in the mean maxima during the hottest month is more than double that in the minima; in other words, winter is more equable along the New South Wales coast than summer. Altogether the difference between that maximum and minimum, even where it is greatest—about 40° at Newcastle,—is still by 24° less than at Greenwich. Also the extreme yearly range of temperature, which at the last-named place was 92·6°, within 1841 to 1875, is considerably less on the New South Wales coast. In 1874, for instance, the highest temperature observed at any of those stations was 106°, and that at Eden, the southernmost one; on the other hand, the lowest—34·7°—was at the station nearest the equator, Port Macquarie.

The mean diurnal range of temperature comes more or less near that of Greenwich, 16°. It is smallest—13°—at Cape St. George, greatest at Newcastle—about 18°. The latter place has, of all the coast stations, the least equable temperature.

Sydney—33° 51′ lat. S., observatory 155 feet above sea-level—requires a fuller consideration, being not only a typical representative of the climate of the east coast of sub-tropical Australia, but also the oldest established meteorological station in Australasia.

The mean temperature of the year is 62·5°: of the summer quarter—December, January, February—70·4°; of autumn 63·8°; of winter—June, July, August—53·4°; of spring 62·5°. The quarterly course of temperature thus shown closely corresponds with that at Greenwich, only that the difference in temperature between the successive quarters is by about one degree more or less, greater at Sydney. The difference of the two extreme quarters, summer and winter, is at Sydney 17°, at Greenwich 15°. The yearly range at Sydney was in 1872, for instance, 98°—in the sun 136°—and 36°. Snow and ice, especially the former, are rarely seen.

The mean monthly range of temperature—about 14°—is very

much below that at Greenwich, and at the same time remarkably equable all through the year, whilst at Greenwich it ranges from 31·8° in January, to 44·4° in May.

The mean diurnal range is 14°, two degrees less than at Greenwich. It is greatest in October—17·7°; smallest in January—10·6°. At Greenwich, as also in Australia, at stations further south, such as Melbourne and Adelaide, the greatest range is on the contrary in summer, whilst Brisbane, as we have seen, in this respect corresponds to Sydney.

I may be allowed to append here some observations on *soil* and *water temperature* made at Sydney.

The mean annual soil temperature was at a depth of nineteen feet in 1870-75 63°, *i.e.* half a degree higher than the mean air-temperature. The extreme range was only from 59·7° to 65·8°. The maximum is reached about the end of May, the minimum in September and October, *i.e.* about two months after the same conditions in the air-temperature have taken place.

The mean temperature of the sea-water in Sydney Harbour, three feet below the surface, was in 1860-75, 65°. In January it is exactly the same as that of the air in this month, viz. 71°. The greatest difference in favour of the water exists in May, amounting to 6·7°. That the water-temperature never to any extent to speak of falls below that of the air, but mostly is above it, may have its principal cause in the warm current along the east coast, which prevents the water in Port Jackson from cooling down to the same extent as the air-temperature does.

Of *Coast District Stations* in New South Wales, *i.e.* stations situate between the east coast and the Dividing Range, at an elevation not above, mostly much below, 500 feet above the sea. There are seven, lying between 28° 50′ and 33° 56′ lat. S., viz., from north to south, Casino, Grafton, Muswell Brook, West Maitland, Windsor, Paramatta, and Liverpool.

It is interesting to compare the temperature, and its ranges, at Sydney, with that of three other places quite near it, viz., South Head, at the entrance of Port Jackson, from which Sydney lies five miles distant, 254 feet above the sea, offering one of the finest sights in the world, the immense Pacific on the one side, and the lovely bay on the other; Paramatta,

some ten miles west of Sydney, and Liverpool, to the south-west of Sydney, and fifteen miles from the sea.

Of these four places, Sydney has the highest mean annual temperature—62·5°, Liverpool, the lowest—60°, but the summer heat is most intense at Paramatta; then comes South Head, though it is on the sea and high on a cliff, exposed to all winds. It is, I think, to the bare rock on which the South Head Observatory is built, and which is heated and reflects the solar heat more intensely, that its high mean minimum temperature during the hottest months is due. Sydney, in this respect, stands lowest, with 79°. On the other hand, its mean minimum temperature of the coldest months comes by 1½° nearest to that of South Head, which, with 46·6°, takes the first place among the four stations, in other words, the temperature at Sydney is the most equable. Liverpool has the lowest mean minimum temperature, viz., 36·7°. Here, also, the mean daily range of temperature is greatest, 25° against 14° at Sydney. Within a few miles we thus see considerable thermic differences to exist.

The remaining five coast district stations all lie nearer the equator than Paramatta and Liverpool. Windsor and Grafton have a high mean temperature—63·8° and 68° respectively—considering their latitude, Casino 67°, Muswell Brook 64·5°, West Maitland 62·5°. On the whole, the temperature is, particularly in the north, higher at some distance from the sea than at the coast. Though the former does not, at most of these places, go beyond thirty miles, the summers are already considerably hotter, and the winters less mild. The mildest winter as far as the mean minimum temperature during the coldest month goes, was West Maitland 42·5°, though four degrees of latitude more to the south than Casino; at the same time it is not so hot in summer as the more southern Windsor, their mean maximum during the hottest month being 87° and 90° respectively. At Casino it is 93°, at Grafton 95°, the mean minimum at both places is 39°.

The difference in mean temperature between the two extreme quarters is about 5° greater at Maitland and Paramatta than at Greenwich. Winter has at those places about the same temperature as autumn at the latter, and is consequently warmer than spring in England.

The extremes of temperature were in 1872, at Paramatta 98° and 36°, at Maitland 103° and 36°, at Windsor 109·5° and 25°. This also shows the particularly unequable character of the air temperature at the last-named place, similarly, though in a minor degree, as we have seen it at Newcastle among the coast-stations.

The mean daily range of temperature is much greater at some distance from the coast than on it. Also in this point, Maitland stands first as regards equability of temperature, its daily range being only 5½ degrees higher than at Greenwich, viz. 21·5°; it is greatest in October, smallest in June. At Paramatta the mean daily range for the year is 22°, at Windsor 26°; it is highest—28·6°—at the station nearest the equator, Casino.

(*To be continued.*)

Reviews.

Auscultation and Percussion, together with the other Methods of Physical Examination of the Chest. By Samuel Gee, M.D. 2nd Edition. 1878. London: Smith, Elder, and Co.

This little work is distinguished by its clearness, brevity, and completeness. The second edition differs from the first in being somewhat fuller on one or two points, and in having a few new chapters. The movements of the heart, valvular thrills, pulmonary œdema, empyema, and mitral regurgitation, are all handled more fully, and new sections are introduced on sound in general, and plugging of the trachea, and on asthma and embolic pneumonia. The index is not so carefully done as one would expect from the accuracy of the body of the work; for example, under pleural effusion we find a reference to empyema, but on looking for this word we do not discover it under the letter E.

This book has already established a place for itself as one of the best on the subject in the English language, and the second edition will doubtless be regarded with even greater favour than the first.

Handbook of Therapeutics. By Sidney Ringer, M.D. Sixth Edition. 1878. London: H. K. Lewis.

The Elements of Therapeutics. By Professor Binz. Translated from the 5th German Edition by Edward J. Sparks, M.A., M.B. 1878. London: Churchill.

The rapidity with which one edition of Dr. Ringer's work succeeds another affords ample evidence of the favour with which it is regarded by the medical profession generally. Nor is this wonderful, for the work supplies a felt want, giving useful information which can be obtained from no other book, and which is of the utmost value in practice. The present edition is an enlarged one, and contains new chapters on salicine,

muscarin, and pilocarpine, and extensions of several articles on other drugs. More especially do we notice the introduction of several original observations by the author, leading to very interesting results. The work has now become almost indispensable both to students of medicine and to practitioners.

Professor Binz's book, unlike Ringer's, contains an account of the properties, preparations, and doses of the various articles in the pharmacopœia, instead of dealing only with the physiological action and therapeutical uses of each drug, which are briefly but clearly given. The preparations have been altered by the translator so as to correspond with the English and American, instead of the German, pharmacopœia. The author has been fortunate in getting a translator like Dr. Sparks, who has not only rendered the work into excellent English, but has added a good deal of new matter relating to physiological action and therapeutics as well as to pharmaceutical preparations.

Catalogue of the Collections in the Museum of the Pharmaceutical Society of Great Britain. By E. M. Holmes, F.L.S. 1878. London: Pharmaceutical Society of Great Britain.

Although this is only called a catalogue, it contains so many notes by the author that it really constitutes a valuable work on materia medica. The information which it affords regarding the number of plants which are not officinal, as well as concerning the adulterations of such as are contained in the pharmacopœia, is considerable; and this book has supplied us with answers to several questions which we had previously attempted in vain to solve by reference to other volumes. Its publication is a boon to all who are especially interested in materia medica.

On the Uses of Wines in Health and Disease. By Francis E. Anstie, M.D., F.R.C.P. Reprinted from the *Practitioner*, 8vo, pp. 74. London: Macmillan and Co.

The volume contains, in a collected form, the papers on the use of wine which originally appeared in the *Practitioner*, and on account of its convenience for reading will be welcome even to many who possess the volumes in which the articles originally appeared. It is unnecessary to say anything about the services Dr. Anstie rendered to mankind in general and to the medical profession in particular by his researches on alcohol. They were simply invaluable as helping to define the precise position to be assigned to alcohol as a food. In the present volume, however, we would draw the reader's special attention to the remarks on the difference between pure alcohol and wines, and the effects of the ethers which are present in the latter and not in the former. At first sight it would appear that the proportion

of ethereal compounds to the alcohol in wine is too small to produce any very marked alteration in its action, but no one who has noticed the flushing of the face and has felt the fulness in the head or throbbing of the arteries produced by a single whiff of nitrite of amyl, can harbour a doubt that some ethereal compounds are capable of exerting a most powerful physiological action even in minute quantities. The observations on the difference between the effect upon cardiac exhaustion of pure alcohol and of wines weak in alcoholic strength but rich in volatile ethers, are of great practical importance; and those on the use of wine in catarrh and diarrhœa are of great interest at the present time, when the former is prevailing and the latter may be shortly expected. As a handy book for ready reference on one of the most important subjects in medical practice, it ought to form part of every medical man's library.

Clinic of the Month.

The Treatment of Asthma.—In a recent communication to the Académie de Médecine, M. Germain Sée has strongly advocated the employment of two compounds of iodine in the treatment of asthma, iodide of potassium and iodide of ethyl. The former he had tried on twenty-four patients at different ages, and in every case but one he obtained remarkable results, although in several cases the varieties of asthma were different. Some hours after the administration of the drug there was a notable diminution in the symptoms of dyspnœa and oppression. The severe attacks were in most cases arrested at the end of twenty-four or forty-eight hours, and by the continued employment of the drug the severity of the disease was greatly lessened. By administering it some hours before an expected seizure the regular attack would be prevented, and by giving it during an attack its intensity was much lessened. The dose with which Mr. Sée commences is a scruple a day, with or without a little opium, and this is generally increased to half-a-drachm, or two scruples a day, the doses being given at meal times so as not to irritate the stomach. He maintains that iodism when it occurs is produced as much by small as by large doses of the drug, and he corroborates the statement of Mr. Gosselin, that commencing iodism may often be arrested by doubling the dose. Occasionally he combines with this treatment the administration of fifteen or thirty grains of chloral at night to promote sleep. The first action of the iodide is to increase the secretions of the respiratory duct, the dryness of which intensifies very much the distress during the seizure. The sibilant *râles* which mark the onset of the attack disappear, the dyspnœal distress is lessened, and breathing is rendered in a few hours far more free; orthopnœa yields to normal respiration, recent emphysema disappears, and the increased resonance becomes normal. Whether the asthma be nervous or catarrhal the effect is the same, and hence he supposes that the iodide may act directly upon the nervous system. The remedy can hardly however be regarded as a cure,

since, in order to maintain the good effect, it is necessary to continue its administration for months, or even years, or the attacks will recur. The use of iodide of potassium in asthma is not however so new as Dr. Sée supposes. It is an old American remedy ; was used by Trousseau, and was recommended by Dr. C. J. B. Williams some years ago. An actual attack of asthma may, M. Germain Sée states, be at once arrested by the administration of five to ten drops of iodide of ethyl. The relief is so immediate and so complete that the patients beg for more of the remedy. Iodide of ethyl is a compound of iodine and ether. The latter has long been employed in the treatment of the asthmatic attack. It may be doubted whether iodide of ethyl will be found so potent or uniformly successful as the nitrite of amyl, which as employed for this purpose by the late Dr. Anstie, is certainly a remedy of the greatest value.—(*Lancet, April 13th,* 1878.)

Syphilis Treated by Excision of the Primary Induration.—According to modern theories, neither the destruction of an indurated chancre by means of caustics, nor its removal by the knife, is likely to prevent the development of constitutional symptoms. The latter method has, however, lately been tried by Professor Auspitz, of Vienna, and in a recent number of the *Vierteljahrsschrift für Dermatologie und Syphilis*, he gives an account of thirty-three cases thus treated. He uses a pair of scissors for excising the ulcer with the surrounding induration, and forceps or a sharp hook for raising the affected parts. By means of a spray-producer, carbolic acid is applied to the wound during and after the operation, and if any remains of induration are discovered in the wound they are carefully removed. Sutures, if necessary, or strips of plaster, with carbolised wadding form the dressing, and the results obtained in the thirty-three cases may be thus summarised. (1) In four cases in which the induration supervened upon a soft sore the patients remained free from constitutional symptoms. (2) Although in nearly all the cases there was indolent enlargement of the lymphatic glands, on the most careful examination no other glands were found to be similarly affected. (3) Those cases in which after excision no fresh local induration occurred, remained as a rule free from syphilis. (4) Phagedæna, which sometimes followed the excision, did not prevent the development of constitutional symptoms. (5) The absence of constitutional symptoms in many cases where there was primary induration, shows that this latter is not to be regarded as evidence of constitutional infection, but rather as a primary depot from which the system becomes infected. The same reasoning applies to the indolent enlargement of the inguinal glands, which must be distinguished from the general swelling

of the lymphatic glands in syphilitic dyscrasia. In nearly all the cases treated by excision, in which constitutional symptoms failed to appear, the inguinal glands were decidedly swollen. (6) The recrudescence of the infiltration in the wound caused by the excision in those cases in which constitutional symptoms occurred, and in those alone, is not to be regarded as evidence of the circulation of the poison in the system, but as the result of a local action of the infectious material still present, either because the excision has been imperfectly performed, or because of the wide-spread syphilitic changes which have taken place in the vessels. (7) Whether, in those cases in which constitutional symptoms result in spite of excision, the latter exercises any influence over the nature or duration of the subsequent manifestations, is a question which must be decided by further trials; in some cases the operation appeared to exercise a modifying influence. (8) Excision is to be recommended as a prophylactic measure under certain circumstances, which are as follows:— Shortness of the period during which the induration has existed; absence of complications other than indolent swelling of the inguinal glands; favourable situation of the sore as regards excision. In respect of this last condition, sores on the body of penis or prepuce are more favourably situated than those on the glans or sulcus coronarius.—(*Medical Examiner, No.* 113, 1878.)

The Treatment of Ascites by Abdominal Compression.—Dr. Stephen Mackenzie observes that there are numerous ways of treating the ascites dependent upon contraction of the liver. Alteratives, drastics, diuretics, tonics, compelling the patient to satiate his thirst from his peritoneal cavity, simply keeping him at rest in bed—all have their advocates. He, however, has found that in cases where there is any tendency to absorption this may be greatly accelerated by a simple method—that of abdominal pressure; whilst in cases in which absorption does not appear to be taking place the same plan is often successful in removing the fluid. He records a case in which a woman, æt. 41, was admitted under his care into the London Hospital with ascites, which had been increasing for the space of a year at the rate of an inch a month. She was much emaciated, and had œdema of the legs. The urine was freely discharged. After some preliminary treatment, the abdomen was ordered to be tightly bound with a flannel bandage, so as to exercise pressure. When first applied the pressure caused a feeling of sickness, but this was soon borne without discomfort, and appeared to afford relief. A properly-made abdominal support was now constructed, which could be tightened to a considerable degree. By degrees the fluid

effused diminished in quantity, and for nearly three years she has had no recurrence of ascites. The plan was equally successful in a second case, and he strongly recommends that further trial should be made of it.—(*British Medical Journal*, April 20, 1878.)

The connection between Pruritus Vulvæ and Diabetes.—Dr. Wiltshire calls attention to the frequency with which pruritus vulvæ is associated with diabetes, and points out the desirability of a systematic examination of the urine for sugar in suspicious cases. He remarks that apart from the itching there may be no symptom whatever of diabetes—neither polyuria, loss of flesh, nor large appetite; and it is not, therefore, a matter of surprise that the underlying diabetic affection frequently remains unsuspected. He records a case of a stout, florid, middle-aged woman, who came under his care tormented with violent itching of the vulvæ. Suspecting diabetes, he had the urine examined, and then and ever since it has contained sugar. The treatment, which proved perfectly successful, consisted merely in the application of a borax lotion.—(*Lancet*, April 13, 1878.)

The Treatment of Varix by the Subcutaneous Injection of Alcohol.—A new method of treating varicose veins was described by Dr. Englisch at a recent meeting of the Vienna Medical Society. By means of an ordinary hypodermic syringe, from fifteen to twenty drops of a mixture of alcohol and water, in equal parts, are injected into the cellular tissue beneath the vein, which, together with a fold of skin, has been previously raised by the thumb and forefinger. The injection gives rise to a small swelling, and on close observation the vein may be seen to contract. More or less infiltration is observed on the third day, and in very sensitive patients the skin is apt to become red, and even a small abscess may form, the vein itself not becoming involved in the suppuration. As the infiltration becomes firmer and smaller the vein also diminishes in size, and gradually becomes hard and cord-like. In some cases one such injection may suffice to effect a cure of the varix, but in the majority the operation has to be repeated several times. The results are most successful when the dilated veins form a plexus, but the treatment is more difficult when there are many branches. The pain during and after the operation is very slight; the length of time required for the subsequent treatment varies according to the gravity of the case. In cases where the result is not entirely successful the operation appears to be a valuable auxiliary to other palliative measures. Dr. Englisch claims for his method that it is absolutely free from danger. He was induced to make trial of it for the cure of

varix in consequence of the excellent results he obtained from the use of similar injections for the radical cure of hernia.—(*Medical Examiner*, No. 112, 1878.)

Treatment of Epulis by Electrolysis.—At a late meeting of the Clinical Society Mr. Nunn read some notes of cases of epulis treated by electrolysis. He remarked that this mode of treatment was peculiarly applicable to such cases, as they present considerable difficulties to ordinary operative proceedings, and the hæmorrhage that follows is often considerable. The first case was that of a lady, in whom a sensitive and vascular growth, the size of half a walnut, prevented the adaptation of artificial teeth. The patient declining any operation by the knife, the electrolytic treatment was carried out. There were about twenty sittings; six or three cells were used. The tendency to bleed diminished with the progress of the treatment. The pain caused by the current was in proportion to the number of cells employed: it was unbearable when bone or periosteum were touched by the needles, and it ceased immediately on their withdrawal. An injection of chloride of zinc produced intense pain and subsequent irritation. The patient was enabled to wear artificial teeth after the treatment. Mr. Nunn reported three other cases. He advocates electrolysis in these cases mainly on the grounds of its painlessness, ready applicability, and freedom from hæmorrhage. The cells employed contained manganous oxide and iron, chloride of ammonium being the exciting fluid. The electrodes should be of gilded steel, or of platinum.—(*Lancet*, April 20, 1878.)

An Experiment on the Disinfection of Enteric Excreta.—Dr. J. Dougall, proceeding on a statement made in the report of the Medical Officer of the Privy Council, determined to test the disinfecting power of Condy's fluid, or a solution of the permanganate of potash, on enteric excreta. The statement in the report is, that when permanganate of potash is used to disinfect a virulent fluid containing much organic matter, or any compounds capable of decomposing the permanganate, there is no security for the effectual fulfilment of disinfection short of the presence of undecomposed permanganate in the liquid, after all chemical action has had time to subside. Dr. Dougall conducted his experiment as follows:—To a newly passed, characteristic, ochrey coloured, enteric stool, quantity unknown, a portion of a known quantity of Condy's fluid was added. The mixture was then stirred and set aside for a short time, and when the pink colour had changed to brown, more of the fluid was added, and the process repeated till the pink colour was found permanent after the lapse of twelve hours; in other words chemical action in the mixture had subsided, as

indicated by the presence of the undecomposed pinkish permanganate liquid. A simple calculation showed that one ounce of enteric fæces had de-oxidized not less than ten ounces of Condy's liquid. He experimented in the same manner with a fluid ounce of enteric urine, with the result that one ounce of the urine de-oxidized at least two ounces of Condy's liquid. Dr. Dougall then observes, that supposing a typhoid patient passing twelve ounces of fæcal matter, and twenty ounces of urine, during each twenty-four hours, say for a week, and supposing the Condy's liquid sold to the public in eight ounce bottles at one shilling each, is used, it follows that 280 ounces of Condy's liquid are required to oxidize or disinfect the week's urine, which at one shilling per eight ounces amounts to £1 15*s.*, and that 840 ounces are required to oxidize or disinfect the week's fæces, which at one shilling per eight ounces amounts to £5 5*s.*, in all £7 per week, or at the rate of £364 per annum. Supposing a hospital with thirty enteric patients on an average constantly under treatment: on these data, it would take £10,920 worth of Condy's fluid to disinfect their yearly excretions. —(*British Medical Journal*, March 16, 1878.)

Successful Case of Transfusion.—At the meeting of the Dublin Obstetrical Society, held on the 12th January, 1878, Dr. McClintock reported a case of tranfusion performed with success. The lady was taken in labour at 9 A.M. At 2 P.M. Dr. McClintock saw her. The case was one of abnormal presentation, and a leg presented. The child was dead, but had not long been so. Serious hæmorrhage had set in early. She was then senseless and pulseless, and had had two slight convulsive seizures. The child and placenta were easily extracted, and there was no more hæmorrhage. On learning that the child was dead, she became prostrate, and never spoke for several hours afterwards. Dry linen was at once placed next her, warm jars to her feet, and stimulants administered. The uterus contracted tolerably well. She got brandy both by the mouth and rectum, and heat was applied all over the surface of the body. The trunk and lower limbs were elevated, and the head kept very low, in addition hypodermic injections of sulphuric ether were administered, which appeared to impart a momentary increase of strength and vitality. She remained in this state for five or six hours, fluctuating between life and death. It was then thought that the only chance that remained to her was the operation of transfusion, and a message was despatched to Dr. Robert McDonnell to come with the necessary apparatus. He reached the patient's bedside about eleven o'clock, that is nine hours after she had been delivered, her condition being such as just described. Blood was at once obtained from the patient's

husband, defibrinated, and injected into the arm without difficulty, except that owing to the extremely anæmic state of the body, it was not easy, even after the integuments had been divided, to distinguish a vein. However, this difficulty was successfully overcome, and about ten ounces of defibrinated blood injected into the right arm. The patient was apparently quite insensible, and offered no resistance to the operation, by jactitation or in any other way. While the blood was being injected into the arm, a careful note of the pulse at the wrist was kept; and after a few ounces had been injected, a slight improvement in the condition of the pulse was discovered. Nothing untoward occurred during the operation; and after the blood had been all injected, the arm was bound up, her pulse being then somewhat further improved, and in the course of a few hours subsequently decided indications of reaction began to show themselves, and at the end of twelve hours the restoration was complete. From that time forward nothing could go on better or more satisfactorily than her convalescence in every respect.—(*Dublin Journal of Medical Science*, March, 1878.)

Extracts from British and Foreign Journals.

Treatment of Amenorrhœa.—Prof. Courty employs a pill composed of powdered rue, savin, and ergot, of each five centigrammes (2–3 gr.) and aloes from 2–5 centigrammes. Of these thirty are ordered, and three are taken the first day, six the second day, and nine the third day, always in three doses. They are suited for cases of idiopathic amenorrhœa, without great reaction on the economy and when there is reason to suppose that the suppression of the menses is due either to an insufficient determination towards the genital organs or to a difficulty of discharge due to inertia of the uterus. In order to encourage the fluxion towards the genital organs, Dr. Courty orders, before beginning the pills, foot baths, sitz baths, and fumigations. He also applies leeches to the labia during the three days the pills are being taken. The pills generally induce colicky pains and often a little diarrhœa. (*Union Médicale*, Fig. 19.)

Treatment of Hydrocele by Electricity.—Signor Macario reports two cases of hydrocele treated by a single application of an electric needle for the space of one minute. One of these cases was permanently cured; the other was only temporarily cured, the disease returning after ten months. In both instances the fluid entirely disappeared in the course of twenty-four hours, though no fluid escaped through the wound made by the introduction of the needle. Macario recommends the employment of this method in other kinds of cysts, especially for ovarian cysts, and cites three cases that have been published as cured by this means. (*Gaz. Med. Ital., Lombard.* No. 36, 1877.

The Action of Potassium Salts.—Dr. Buchheim remarks that the potassium salts possess a greater degree of diffusibility than those of sodium, whilst they differ *inter se* according to the acid with which the base is combined. The oxalate and nitrate are more diffusible than the compounds with chlorine, bromine, and iodine, whilst the sulphates, phosphates, and bicarbonates are the least diffusible. The action of the salts depends in great

measure on these differences, and they may accordingly be divided into two groups.

The first group includes the most easily diffusible salts of potassium. These overcome, by the energy of their diffusive power, the arterial pressure of the capillaries in the stomach, cause the blood corpuscles to accumulate in the capillaries, so that ecchymoses sometimes occur and produce gastritis, with pain and vomiting. These phenomena are most marked in the case of the oxalate and nitrate. The symptoms are less marked during digestion, or when the salts are in a state of dilution. In the latter case, though the absorption chiefly takes place in the stomach, but in part also in the small intestine, the second group, including the less diffusible salts, pass more readily into the small intestine, where they induce peristaltic action, and are eliminated after only partial absorption. Potassium sulphate forms the transition between the two groups in large doses affecting the membrane and in smaller doses being a powerful purgative. According to Bunge, not more than half is eliminated from the kidneys. Potassium carbonate in large doses acts as a caustic on the mouth and stomach, becomes in the stomach quickly converted into bicarbonate, and acts as an aperient only when the intestinal mucous membrane is unusually sensitive. The combinations with vegetable acids become converted into bicarbonates, and on this account are unreliable in their action.

But inasmuch as the effects of the salts upon the whole body are conditioned by the diffusibility, that is to say, by the activity of absorption into the blood, and in part also by the activity of elimination, only large doses of the oxalate and nitrate, and of the combinations with chlorine, bromine, and iodine can act therapeutically, the other salts being inoperative. Now according to physiological investigations the ashes of blood serum contain only sodium salts, those of the blood corpuscles only potassium salts, and as the albuminous materials of the whole body contain chiefly potassium salts, the amount of potassium circulating in the blood is small and all potassium that is not combined with albumen in the blood is quickly excreted by the kidneys. Hence the introduction of a large quantity of potassium salts into the blood, either by injection or by the stomach, must have well-marked effects; these are retardation of the beats of the heart with arrest in diastole. In frogs the muscular contractility is abolished, the excised heart stopping rapidly in diluted solution of potassium, and more slowly in a solution of sodium chloride of equal strength; both of these are consequently regarded by Ranke as muscle-poisons. The paralysis of the heart observed after injections of salts is not, as Podcopaew states, a specific action, but the direct action of the salts upon the first muscle with which they come into contact. Moreover, certain

nerve-centres are similarly paralysed with the muscles, in consequence of a very similar chemical composition. The muscles contain the largest amount of potassium salts, 86 per cent. being contained in the ashes of broth. The contractile substance is probably a combination of certain albuminous compounds with potassium salts, a disturbance of the contractile power is occasioned by the access of large quantities of such salts, but the relations of the nervous system to potassium salts is not at present explicable. Death occurs at times in warm-blooded animals before the occurrence of recognisable changes in the cardiac muscle, apparently because slight disturbance of the nervous and muscular apparatus of this organ is sufficient to endanger life. (*Med. chir. Rundschau,* Heft 9, Bd. 18.)

Therapeutical Properties of Salicylic Acid.—H. Köhler gives as the result of a large number of experiments with salicylic acid and its salts—1. That in febrile conditions both salicylic acid and sodium salicylate lower the temperature. 2. That in large doses salicylic acid depresses the respiratory activity, and may even cause death by asphyxia. 3. Salicylic acid does not exist in the blood in the uncombined state, but as sodium salicylate, in which state it is eliminated in man at least by the kidneys. 4. Salicylic acid acts as an antiseptic but sodium salicylate arrests neither fermentation nor putrefaction. In this point of view it is remarkable so long as we admit the identity of the action of antiseptics and of the antifebrile action of certain drugs that both salicylic acid and sodium salicylate lower the temperature in typhus, articular rheumatism, and the febrile state of phthisical patients. Köhler set himself the task of determining whether salicylic acid alone or both it and its salts possessed the power of lowering the temperature in healthy dogs, and he was led in the first instance to notice its effects (*a*) upon the respiration, and (*b*) upon the circulation. He found that both in dogs and in rabbits salicylic acid and sodium salicylate when ingested into the stomach or injected into the blood, rendered the respiration slower, apparently by depressing the excitability of the sensory nerves, *i.e.* the branches of the vagus in the lung, leading to asphyxia by carbonic acid poisoning. In regard to the circulation he found that when quickly injected and in large quantities the blood pressure rapidly sunk almost to zero, followed by convulsions and death, or in some instances, by great retardation of the cardiac movements with sphygmographic curves of immense height, and a more gradually occurring fatal issue. The causes of this depression lay in the heart itself, and appeared to be due to the action of the drug on the ganglionic apparatus or to paralysis of the muscular tissue of the heart. In regard to sodium salicylate, though not acting so

rapidly or powerfully as salicylic acid, its effects are essentially the same. The cardiac branches of the pneumo-gastric have their excitability lowered and before death are entirely paralysed, and the same results occur from the ingestion of sodium salicylate into the stomach as from the injection of salicylic acid into the blood. In regard to the distribution of temperature he found that in healthy rabbits, cats, and dogs, the injection of from six to ten cub. cent. of salicylic acid or sodium salicylate into the jugular vein or the ingestion of from ten to twenty cub. cent. of solution of sodium salicylate into the stomach caused a depression of temperature of about three degrees Centigrade (or 5° Fahr.) just as occurs in man during the febrile state. But inasmuch as the sodium salicylate does not possess any antagonistic properties to fermentation and putrefaction, whilst salicylic acid is immediately converted into sodium salicylate after absorption, there is strong reason for not regarding antiseptically acting substances as being also antipyretic. The diminution of temperature observed after their administration can only be partially explained by the above-mentioned modifications of the functions of respiration and circulation, though it undoubtedly goes hand in hand with them; possibly it may be due to some influence on the vaso-motor nerves leading to dilatation of the peripheric vessels, and consequent lowering of the temperature of the blood; this hypothesis affords an explanation of the congestions of the head, singing in the ear, profuse perspirations, and diuresis observed in many animals.

From all this the following conclusions may be drawn:—1. That it is only when externally or topically applied that salicylic acid acts antiseptically. 2. When salicylate acid is ingested by the mouth it loses its antiseptic action because it becomes united with an alkali, and it then only acts on the economy like sodium salicylate when taken internally. 3. Both salicylic acid when taken internally and salicylate of soda, though destitute of any antiseptic action, are yet capable of depressing the temperature of the body in febrile conditions to an extent unapproached by any other remedy.

As rules for practice Köhler considers that salicylic acid is exclusively to be used as a topical antiseptic, and in this point of view it is extremely valuable in diphtheritis of the tonsils, pharynx, and nose, where it may be applied in the form of solution containing one part in three hundred. Also as a prophylactic remedy in infectious blenorrhœas, in leucorrhœa,and chronic cystitis and in dysentery and diarrhœa; and it is also useful in dyspepsia and the migraine accompanying it, preventing fermentative processes in the stomach; for this purpose the ferro-salicylate is best adapted. Sodium salicylate can be more readily used on account of its greater solubility. One drachm and a half may

be given once or twice in twenty-four hours, which acts more promptly in reducing the temperature in fever than quinine and cold water. Its lowering action on the temperature very rarely fails in acute articular rheumatism, diphtheritis, typhus, or local inflammations. Singing in the ears and deafness are the only inconveniences that occur from the use of sodium salicylate. (*Med. chir. Rundschau*, Heft 9, Jahrgang 18.)

The Action of Squills.—Professor Husemann states that the squill is one of the oldest known remedies ; its use in the cure of dropsy having been known to Pythagoras ; yet that the mode of its action is still unknown. Pythagoras recommended the Acetum scillæ; Hippocrates the Mellitum scillæ, and the preparation termed Oxymel scilliticum was in use in the first century of our era. No alkaloid has hitherto been obtained from squills. The so-called scillitin being only a purified extract, and quite unreliable in its action. Professor Husemann finds the diuretic action of squill to be closely connected, and in fact inseparable from its toxic influence. From the researches of Schroff and Rabuteau it appears that squill contains a substance resembling digitalin, which in toxic doses causes great retardation of the action of the heart and ultimate arrest of its movements in systole. This effect results without any inflammatory condition being set up in the stomach or intestines. The vomiting which follows its administration is an effect which squills has in common with all cardiac poisons. In frogs, squill first induces slowing of the pulse, then, in succession, arrest of the action of the ventricle, arrest of action of the auricle, and complete loss of irritability of the heart. The spinal cord, nerves, and muscles, however, retain their normal excitability, so that the animal can leap. In warm-blooded animals the characteristic double action of the cardiac poison is exhibited, namely, upon the inhibitory nerve centres and upon the cardiac muscle itself, shown by retardation of the cardiac action, and systolic arrest before the stoppage of respiratory movements, and by final loss of the power of reaction of the heart to electrical or mechanical stimuli. According to Professor Husemann, both in frogs and in warm-blooded animals, extract of squill, at the commencement of its action, augments the strength of the heart's action, in this agreeing with all cardiac poisons as digitalin, helleborin, and antiarin, and this action, according to Traube, explains its power of causing diuresis. It also, in the first instance, causes increased tension of the arteries, and is hence contra-indicated when this condition is present. Professor Husemann has never observed a trace of inflammation of the kidneys in his experiments, or of any effect that might suggest that squill acts as a direct stimulant to these organs. He was unable to observe in experiments

on animals any indication of squill possessing an expectorant action. In former times the dose of squill was very much greater than at present. (*Deutsche med. Wochens. f. prakt. Aertze*, 1876; and *Rundschau*, Heft 9, 1877.)

Cicatrization of Large Wounds under the so-called Bordeaux Dressing.—Dr. Azam has collated the statistics of a large number of cases of extensive wounds, especially amputations, which were dressed in the manner peculiar to Bordeaux. In this dressing the aim is to secure immediate union of the entire surface of the wound. Its three cardinal points are drainage, deep sutures, and superficial sutures. After the hæmorrhage has been controlled as thoroughly as is possible, a thick drainage tube is laid in the deepest part of the wound—in amputations, behind the bone—and fastened over the limb between the two angles of the wound. The flaps are next united at their bases by deeply placed double sutures of very fine silver wire, and the ends of the sutures are twisted over a piece of a sound. These sutures are from two to three in number, according to the thickness of the flaps, and are situated from four to five centimetres from the edges of the flaps. Finally the wound is carefully closed by harelip pins and twisted sutures, supported by strips of charpie dipped in collodion. The entire part is then enveloped in wadding, except at the places where the drainage tubes lie, which are covered with charpie to soak up the discharge. On the second or third day the harelip pins are removed and the deep sutures loosened. The dressing is renewed every three or four days. Cicatrization is completed in from ten to twenty days.

Dr. Azam saw an amputation of the thigh heal up in ten days, and an amputation of the leg in eleven days. In 202 amputations, of which sixty-three were amputations of the leg or thigh, there were twelve deaths; out of thirty amputations of the thigh there were five deaths, and out of thirty-three amputations of the leg there were three. (*Allg. med. Cent. Zeit.*, Aug. 8; *N. Y. Med. Rec.*, Sep. 1877.)

Bromide of Potassium in the Vomiting of Pregnancy.—Dr. Samuel Busey of Washington states that as a rule the bromide should be given in the form of enemata, in doses varying from thirty grains to one drachm dissolved in beef-tea to which brandy and laudanum may or may not be added, every four hours, until the nausea and vomiting have ceased, and the stomach will retain some bland food and stimulants if necessary, and then it should be gradually withdrawn by extending the intervals between the enemata. This treatment has not failed in any case that has fallen under his observation, but he warns the practitioner that he should by no means con-

sider that, with the cessation of the vomiting, the necessity of further and prolonged care is not requisite. The treatment of the obstinate vomiting of pregnancy by the bromide appears to have been suggested by Dr. Girabetti, who administered it in increasing doses, beginning with ninety-two grains the first day, 120 the second, 150 the third; after which he lessened the dose in proportion to the effect produced. (*Amer. Jour. of Med. Sci.*, Jan. 1878.)

The Action of Pilocarpin.—Dr. E. Kurz records that a patient with emphysema of the lungs and severe bronchial catarrh, had œdema of the lower extremities, atheromatous arteries, feeble and irregular cardiac sounds, and a serious dyspnœa. Half a drachm of a two-per-cent. solution of pilocarpin was injected under the skin. After ten minutes the medicine began to show its specific effect. The perspiration, however, was not very profuse; the skin became moist, but the sweat did not collect in drops. The salivation was very pronounced, and the bronchial mucus seemed to be expectorated with greater ease. The excretion of urine was not increased. The œdematous swelling of the legs diminished at once. The dyspnœa was less severe, and the patient, who had neither headache nor nausea, felt quite comfortable. The remedy was repeated several times, always with the same pleasant effect upon the patient's condition. (*Memorabilien*, 1877, No. xi. *Chicago Med. Journal and Examiner*, Feb. 1878.)

A Case of Vomiting in Pregnancy successfully treated with Ingluvin (Ventriculus Callosus Galinaceus).—Dr. Charles G. Frowert, of Philadelphia, Pa., states that he was called to see a lady, aged 27 years, who stated she was suffering from constant and excessive nausea, only relieved upon assuming the recumbent posture. This continued, gradually increasing from day to day, until in a week it eventuated in retching and emesis, during which watery matter with an acid taste, followed by bile, was ejected. This reached such an extent that the patient had hardly any freedom from it during the whole twenty-four hours, vomiting as often as twelve times a day.

Taking this in connection with suppression of the menses, he concluded she was pregnant, and obtained from her the following history:—

This was her third pregnancy. With the two preceding ones she suffered quite as much as with this, and, according to her statement, "had employed the services of several physicians, who administered almost every medicine in the pharmacopœia," but without avail, and she was obliged to lie in bed almost the entire nine months, in order to obtain relief from vomiting.

Dr. Frowert proceeded to treat her in the orthodox way; advised the administration of a gentle cathartic, gave carbonic-acid water freely, and prescribed the following:—

℞	Bismuthi subnit.	ʒj.
	Pepinæ sacch.	ʒss.
	Cerii oxalat.	gr. ix.

M. In chart. No. vj. Div. et sig. one every two hours in carbonic-acid water.

This was not followed by the slightest remission in the symptoms.

He then doubled the quantity in each powder; this also failed.

He finally increased the subnitrate of bismuth to ʒi. doses every three hours, as recommended by several eminent physicians. This was followed by acid. hydrocyanic. dil., two drops every three hours, also highly spoken of. Various hygienic measures, as well as some other medicines were resorted to, but all failed to bring about the desired relief.

About this time his attention was called to the preparation *ingluvin*, recommended in cases of this kind, and he determined to try it at once.

He prescribed *five grains* of Warner's ingluvin every two hours, and continued this for three or four days, without any appreciable result other than diminishing the violence of the attacks of retching and vomiting.

Increased the dose to *ten grains* every two hours. This seemed to relieve his patient to such an extent that she only vomited before meals, at the sight or smell of food.

He then increased the dose to *fifteen grains*, giving it half an hour before each meal. This soon had the desired effect of controlling the attacks. Continuing the same dose every three hours, the vomiting and nausea ceased entirely in four or five days.

She made a complete recovery in the second month of her pregnancy, in three weeks from the time she commenced the use of ingluvin.

Ingluvin has certainly proved very efficacious in his hands, and he would therefore cordially recommend it to the medical profession as worthy of a trial. He considers it an invaluable remedy in obstinate cases of vomiting in pregnancy.

He adds that he has used ingluvin successfully in several cases of chronic dyspepsia, in which pepsin had failed. (*New York Med. Record*, Oct. 20, 1877.)

Exophthalmic Goitre cured by Galvanization of the Sympathetic in the Neck.—The *Gazette Médicale* of Sept. 1,

quotes the following case from the *Giornale Veneto di Scienze Mediche:* The patient was a girl nineteen years of age; her brother suffered from progressive muscular atrophy, her sister from frequent attacks of hemicrania, and she herself had been subject, throughout youth, to repeated diarrhœas accompanied by colicky pains, which occurred without traceable cause, and proved rebellious to all treatment.

Two years ago the eyes became more prominent, and palpitation of the heart appeared. Shortly afterwards a tumefaction of the neck was noticed, accompanied by emaciation, prostration, frequent flushing of the countenance, diarrhœa, and change of character, which became irritable and capricious: the digestive functions became languid. Dr. Ancona proposed galvanization of the first cervical ganglion of the sympathetic. The poles were applied to either side of the neck behind the angle of the jaw, pressing back the sterno-mastoid muscles. He employed at first ten elements of the apparatus of Dr. Stoehrer. Each application lasted from three to five minutes. After a few days the circuit was frequently interrupted.

The physiological effects observed were: Dilatation of the pupils at each closing of the circuit, more marked on the side corresponding to the negative pole; slight contractions of the sterno-mastoid muscles; sometimes an increased flow of saliva, and a coppery taste in the mouth; occasionally some vertigo. In the course of five months, one hundred sittings were had. The treatment was well borne, and during the whole time she only suffered from one severe attack of hemicrania, and two very light ones. With the treatment by electricity was associated the internal administration of arsenic. From the very beginning of the treatment a notable amelioration was observed which proved continuous, so that at the end of five months the patient had increased in weight some 13·5 kil. (about thirty pounds). The face and the mucous membranes gradually returned to their normal colour. The eyeballs regained their position and their mobility; the thyroid body became greatly diminished in size; the pulsation of the arteries ceased to be visible; the cardiac impulse became regular; the pulse beat forty times a minute; menstruation became regular, and with the digestive functions the strength returned. (*New York Med. Record,* Oct. 20, 1878.)

Notes and Queries.

NOTES AND CORRESPONDENCE.

The Dublin Whisky Distillery Co.'s (D. W. D.) Whisky.—This is a very pure mellow spirit of high character, and seems very free from fusel oil, and the other ingredients which produce unpleasant after-effects. Its taste is that of a good Irish whisky, and it ought to make its way on its merits.

Animal Broth as Nutriment.—Dr. Mary Putnam Jacobi requests us to state that the paper on this subject, of which we gave an analysis in the *Practitioner* for December, 1877, was by Dr. Josephine Horton, and was her thesis at the New York Medical College for Women, generally known as the Blackwell College.

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Department of Public Health.

CHOLERA IN RELATION TO CERTAIN PHYSICAL PHENOMENA.

A Contribution towards the Special Inquiry sanctioned by the Right Hon. the Secretaries of State for War and for India.

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(*Continued from* p. 313.)

(2.) *The Phenomena of Seasonal Fluctuation in the Prevalence of Cholera considered in reference to the principal Theories regarding the Essential Cause of the Disease.* (a) *As observed in Calcutta.*—In the earlier part of this report an attempt has been made to ascertain the character of the local physical conditions coinciding with the various degrees of cholera-prevalence in Calcutta at different times during the course of the year. The information thus obtained has next to be considered in reference to various current theories relative to the essential causation of the disease.

The most important theories are the following:—

1*st.* That which regards cholera as essentially caused by direct contagion,—by the direct transfer of a poison, manufactured within the human organism, from one person to another: According to it, any fluctuations in the prevalence of cholera must be dependent on corresponding fluctuations, either in

opportunity of transfer, or in the susceptibility of human beings to the influence of the poison.

2nd. The so-called "water theory:" In this, also, the human organism is regarded as the factory in which a specific poison is produced. By one set of the supporters of the theory, water is regarded merely as one means—although by far the most important and influential means—by which the poison is diffused, —is transferred from one person to another. By other authorities, however, water is not regarded as a mere vehicle, but as the medium in which the material produced within the human organism attains its maximum of virulence. According to this theory, fluctuations in the prevalence of cholera must essentially depend on corresponding fluctuations in conditions determining, or facilitating, the transfer of materials produced within the human organism to the water, and specially to the drinking water.

3rd. The theory which, while regarding the drinking water of a locality as essentially determining the prevalence of cholera in it, does not regard its influence as necessarily dependent on the introduction of any specific material manufactured within the bodies of those suffering from the disease: It holds that the drinking water determines prevalence, both by its effect on personal susceptibility, and by being the essential medium in which the specific poison is developed. In any case, the quality of the drinking water of a locality is regarded as the essential determinant of the fluctuations in the prevalence of cholera in it at different periods. Any fluctuations of prevalence in localities in which cholera is endemic are regarded as depending on corresponding fluctuations in the quality of the water, increase and decrease in prevalence being due to increase and decrease in the impurity of the water.

4th. The theory which regards the soil as the essential site of the processes resulting in the production of the material inducing cholera: The majority of the adherents of this theory regard the air as the vehicle, by means of which the material produced in the soil is conveyed to human beings, so as to cause the disease in them; but it is obvious, that questions of vehicle are really subordinate here, and that materials manufactured in the soil may reach the human subject by more than one path. According to this view, fluctuations in prevalence of cholera are

dependent on corresponding fluctuations in the condition of the soil, which may act either on the manufacture or the diffusion of the specific materials.

We have now to inquire how far each of these theories is capable of accounting for the phenomena of seasonal fluctuations exhibited by the prevalence of cholera in Calcutta.

1*st.* The theory of direct contagion : It may be deemed superfluous, at the present day, to enter into the serious consideration of this doctrine, still as it is yet advocated by some whose opinions are entitled to respect, it is necessary to determine the bearing of our data upon it. The normal course followed by the fluctuations in the prevalence of cholera in Calcutta is not merely inexplicable by this theory, but is strongly opposed to it. If prevalence were dependent on direct contagion, the maximum prevalence should occur at those times of year when the population is most liable to close association. As a fact, the maximum prevalence in Calcutta occurs during a period when there is less crowding together, or close association of the population, than in either of the periods immediately preceding and following it. The native population is more crowded together during the height of the cold weather and of the rains than at any other time of year ; for it is then that the people are obliged—by the temperature in the one case, by the rainfall in the other—to pass the nights packed together in their houses, instead of spending them largely in the open air. According to this theory, the prevalence of cholera ought to attain its maximum in December and January, and in July and August ; but, in place of this being the case, these are precisely the periods during which prevalence of the disease is at its lowest ebb.

2*nd.* The " water-theory," as ordinarily understood : This theory also fails to explain the phenomena of seasonal fluctuation in prevalence, or to gain any support from them. According to it, maximum prevalence ought to occur at that period of the year when the meteorological conditions are of a nature calculated to facilitate the entrance into the drinking water of materials derived from the bodies of those suffering from the disease, and specially of the materials of the intestinal excretions. The period during which most material is washed into the tanks and other bodies of water, which, until quite recently, constituted

the universal sources of drinking water in Calcutta is that of those months in which the rainfall is greatest and characterised by the greatest heaviness of individual falls. These months are June, July, August, and September; but the first of these is a month of low medium, while the three others are months of minimum prevalence. With reference to the latter three months, it may be argued, that although the inwash of materials is then great, the inwash of the specific material producing cholera is not so, as it has been in great part removed from the surface of the soil by previous rainfall, and that the influence of what still remains to be introduced is neutralised by the coincident dilution of the sources of drinking water.

This argument is, however, quite inapplicable to the phenomena of June. At this time there has been no sufficient previous rainfall to remove the specific material from the soil surface, or to dilute the water-supply; and yet the abundant and violent rainfall of June is accompanied by a great decrease in prevalence. Equally inexplicable on this theory are the phenomena presented by May and November. In May the amount of specific material ready for introduction must be at a maximum, for the preceding months are those in which the number of cases of the disease—the number of assumed factories of the poison—far exceeds that present at any other time of the year. In May, too, both the total rainfall and the heaviness of individual falls are, on an average, higher than in April; and yet at this very time, when everything, according to the theory, provides for excessive increase in prevalence, there is, on the contrary, a marked decrease. We have here an instance of decrease where the theory requires increase, and the phenomena of November furnish an example of an exactly opposite nature —furnish an instance of meteorological conditions which, according to the water theory, ought to ensure decrease, but which, in fact, coincide with marked increase. When we compare the rainfall of November with that of October, we find that, in so far as provision of means securing inwash of materials are concerned, the latter month occupies a much higher place than the former; and yet the virtually rainless November shows a great increase in prevalence when compared with October.

3rd. The theory which regards the degree of impurity of the drinking water as the essential determinant of the prevalence of cholera: According to this theory, the periodic fluctuations in the prevalence of cholera in a locality in which the disease is endemic are dependent on corresponding variations in the degree of impurity of the water supply. In so far as the general physical conditions of locality are concerned, the degree of impurity of the water must depend on the degree to which the entrance of extraneous impurities is facilitated, and on influences determining the relative proportions of the impurities to the mass of water containing them. The conditions favouring the entrance of foreign matters in general into the sources of water-supply are precisely those described previously as favouring the entrance of specific materials; and the conditions favouring concentration of impurity are those under which the general mass of water is reduced to least bulk. Consequently, according to this theory, the maximum prevalence of cholera in Calcutta ought to occur during the hot and dry season, when concentration attains a maximum, and during the commencement of the rains, when there is great inwash of extraneous impurities without an increase in the mass of the water, calculated to do more than neutralise this addition.

The phenomena presented by the cholera-prevalence of the hot and dry months, at first sight, appear to afford strong confirmatory evidence to the theory; for the season of maximum prevalence occurs then, coincidently with the season of lowest water-level. When, however, the phenomena of individual months of the hot and dry season are examined, the results are not so favourable to it. In May the water-level reaches its lowest, the conditions affecting evaporation being, apparently, more than sufficient to neutralise the effect of the slight excess in the rainfall over that of April. In May, then, the sources of water-supply are reduced to their smallest bulk, and the concentration of the impurities in them reaches a maximum; and consequently, according to the theory, the cholera-prevalence of the hot and dry season ought to come to a climax then. On the contrary, however, the prevalence in May is much less than in either of the preceding months.

The phenomena of June do not show any closer agreement

with the requirements of the theory. At this time, according to the theory, cholera-prevalence ought to continue at a maximum; for, although the mass of water in the sources of water-supply undergoes considerable increase, the conditions of rainfall are such as to insure great inwash of materials from the soil, which has not been purified by any great previous rainfall. June is, however, a month of low medium, not of maximum prevalence. November, also, presents great difficulties to the acceptation of any such explanation of the phenomena of periodic fluctuations in prevalence. In November conditions facilitating inwash of extraneous materials are at a minimum, and the mass of water is greater than in either June or July. The prevalence in November ought, therefore, to be lower than that in June and July; but, on the contrary, it is very much higher than in these months.

4th. The "Soil" theory: The theories which have been considered hitherto assume that the nature of the specific cause of cholera, or, at all events, that the conditions determining the production of the specific cause, are already definitely ascertained. The soil theory, however, does not go so far; and the difficulty of determining the bearing of our data upon it is proportionately enhanced thereby. All that it definitely affirms is, that the specific cause of cholera is developed in the layer of soil lying above the water-level or first impermeable stratum in a locality; and that, therefore, the development must depend on certain conditions of that layer. These conditions are, admittedly, quite undetermined, but must be supposed to be constantly existent, in greater or less degree, within the areas in which the disease is endemic. According to it, fluctuation in prevalence in any endemic locality must be dependent on corresponding fluctuations either in conditions affecting the development of the poison in the soil, or on conditions determining its diffusion from the soil.

So long as the conditions supposed to secure development of the poison are not distinctly defined, it is evident that an endemic locality affords little field for testing the theory in regard to the relation of prevalence of the disease to influences calculated to favour its production. Attention must, therefore, be mainly directed to prevalence regarded as dependent on

diffusion; but even regarding questions of production, there are certain phenomena of prevalence which admit of comparison with the theory. In any locality, like Calcutta, where the layer of soil above the water-level is always of comparatively little depth, and of tolerably uniform structure throughout, the theory may be supposed to assume, that, other things being equal, the amount of the specific material developed ought to increase with the mass of generating stratum. From this point of view, the maximum and minimum of prevalence ought to coincide with the maximum and minimum depression of the water-level, which is very much what we have previously ascertained to occur in reality.

In proceeding to consider cholera-prevalence as an expression of the degree of diffusion of the poison, it must be borne in mind that there are two main channels by which materials developed in the soil may reach the human beings in any locality. These are the water and the air occupying the interspaces between the solid constituents of the soil. If the water of the soil be regarded as the means of diffusion of the poison the phenomena of prevalence in Calcutta present the same difficulties to this theory as they do to those previously considered. This, however, is not the case if the air be regarded as the channel traversed by the poison in passing from the soil to the subjects of the disease. On this hypothesis, maximum and minimum of prevalence ought to coincide with maximum and minimum of soil-ventilation. According to our data, the maximum of soil-ventilation occurs during March and April, coincidently with the maximum of prevalence. And minimum soil-ventilation occurs during the rainy season, the period of minimum prevalence. So far, however, as diffusion alone is regarded as determining prevalence, the phenomena of prevalence in Calcutta do not coincide accurately with the requirements of the theory. The depression of prevalence in December and January, and again in May, remains inexplicable; and all that can be positively affirmed is, that the difficulties opposed by the phenomena of periodic fluctuation in the prevalence of cholera in Calcutta to the soil theory, are less than those encountered by any of the other current doctrines regarding the essential cause of the disease.

It will be observed that in the previous pages no special notice has been taken of the great and persistent diminution in the prevalence of cholera in Calcutta during the last few years. This has been done designedly, in order to avoid complications incident on the discussion of two different questions simultaneously. The present report deals with phenomena which are common both to the period previous to, and to that following, the diminution. To have attempted to combine the discussion of the cause of the diminution in absolute prevalence with one regarding the cause of the variations in relative prevalence characterising different periods of the year, could only have led to confusion and obscurity.

(b) *As observed in Localities in the Endemic Area other than Calcutta.*—The foregoing remarks apply with equal force to the relation which various physical conditions bear to the prevalence of cholera in the other districts in the Bengal Presidency in which the disease may be said to be endemic. It will have been observed that in the stations which have been selected to represent the principal districts of the endemic area taken as a group, the seasonal manifestation of the disease presents a striking resemblance to that in Calcutta—82 per cent. of the total annual cholera taking place during the eight drier months of the year in Calcutta, and 71·2 in the stations taken as a group, the maximum cholera in both occurring during the comparatively dry months of March and April.

As, however, the figures available regarding the prevalence of the disease at the individual stations of this group are so small compared with the statistics of Calcutta, which embrace the general population, it is not to be expected that the monthly proportions should accurately agree. Notwithstanding this, however, and the difference in the surroundings of the classes of the population compared, even the monthly statistics, especially when weeded of manifestly casual occurrences, present a marked general similarity. It is therefore obvious that the conclusions derived from the data regarding Calcutta apply generally to this group of stations also.

(c) *As observed in the non-Endemic Area.*—Seeing, however, that in those parts of the Bengal Presidency in which cholera manifests itself at irregular intervals only, it displays a prefer-

ence for other than the dry months of the year, it will be necessary to consider whether the foregoing remarks concerning the more prominent doctrines regarding the causation of the disease still retain their applicability.

(1.) With regard to *the theory of direct contagion,* it was observed that the fact that cholera-prevalence in the endemic area was at a minimum when, for climatic reasons, the people (during the rainy and cold seasons) are most crowded together, tended to negative the view that personal contact exercised any important element in the extension of the disease.

In the Upper Provinces, notwithstanding the still closer relation which must exist between individuals, owing to the greater severity of the cold, cholera falls to its minimum degree of prevalence at the period of minimum temperature, and a sudden diminution from the maximum prevalence of cholera takes place contemporaneously with the setting in of the colder weather. On the other hand, close association of individuals must also be favoured by the crowding incident on the conditions of the rainy months of the year when cholera is most apt to occur. As, however, the heavier and more continuous rainfall of Lower Bengal, with the correspondent increased crowding together of the people, is contemporaneous with a marked diminution of the disease, the general weight of evidence remains opposed to the doctrine of direct contagion.

(2.) Assuming the water-level registers to give a fair general indication of the fluctuation of the water used for domestic purposes in the different stations where observations were conducted, the theory of the spread of the disease through the medium of drinking water gains greater support in the non-endemic area than in Lower Bengal. A glimpse at the diagrams representing the variation in the water-level of different localities in this area will show that the disease undoubtedly attains its maximum shortly after the level of the water in the wells begins to rise; hence, it might be inferred, when sufficient time has elapsed for the choleraic material dispersed over the soil to find its way by percolation into the wells, and when the water, being low, favours the swallowing of the *materies morbi* in a concentrated form. To this, however, it must be added that a considerable proportion of the cholera of a station occurs before

the water-level in the wells is affected, especially in some stations where the wells are very deep and where the total annual fluctuation does not exceed a few inches. In such cases it must be assumed, either that the cause of cholera was present in the water before the percolated impurities could reach the well, or that the earlier cholera of the season was derived from some other source than that furnishing the later cases. With regard to the production of the "spring" cholera, again, it can hardly be attributed to the percolation of choleraic impurities into the wells; for the ground appears to absorb all the rain that falls at this time, and in scarcely any of the selected stations in the non-endemic area is it observable that the level of the well-water is materially affected by this season's rainfall.

It may, of course, be maintained that while all cases of cholera are not to be referred to the effects of the *percolation* of choleraic impurities into sources of drinking-water, those phenomena which cannot be accounted for in this way are ascribable to the effects of the *direct introduction* of the materials into the water, or other ingesta. But before this can be accepted as a satisfactory explanation of the phenomena, it must be shown that the facilities of introduction at different seasons and in different years vary proportionately to the coincident prevalence of cholera. Until this has been done, the theory seems to assume, that every year in which cholera is generally epidemic, is at the same time a year in which there is an epidemic tendency to the direct introduction of choleraic materials into sources of water-supply.

The streams and rivers must, however, receive a considerable amount of surface impurities by every fall of rain; and if it were true, as some advocates of the "water-theory" maintain, that an infinitesimal quantity of a choleraic discharge finding its way into a river can multiply to such an extent as to be capable of infecting the population of an entire city, a rapid and general diffusion of cholera would be readily accounted for. If this were actually the case, however, it should follow that the progress of cholera along the water-courses and in the direction of the current would be evident to all. In that case any outbreak of cholera which might occur in the earlier part

of the year towards the north-west of the area under consideration, ought to be traceable week by week along the line of the streams and rivers which flow into the Ganges in the North-West Provinces, Oudh, Behar, and so on, in a direction towards the sea; but experience shows that, so far as the disease can be tracked in any definite direction—that is to say, so far as the circumstance that the months of maximum cholera-prevalence present a certain ill-defined, progressive arrangement along the stations in the Gangetic plain, can be taken as indicative of the "direction" taken by the disease—this direction is precisely the reverse of that followed by the numerous streams and rivers: cholera attains its maximum in March and April towards the mouths of the Ganges, but not till August at its sources.

(3.) In so far as the endemic area is concerned, there can be no doubt that the soil theory is more in accordance with the phenomena of the seasonal prevalence of cholera than any of the other theories previously considered. In regard to Upper India the evidence is as yet defective, and detailed data are wanting on many points. There are, however, certain important facts pointing very distinctly to the importance of local soil-conditions in relation to cholera-prevalence in this area also.

It was remarked, in one of the earlier chapters of this paper, that the nearer the soil of a district in India approaches in character that constituting the lower portion of the Gangetic plains, the greater is the likelihood that cholera will be found as an endemic disease in it. It has been seen that the seasonal manifestation of cholera changes gradually as we proceed up the river, the disease manifesting a tendency to be deferred later and later in the year the farther the affluents of the Ganges are followed towards their sources, and the drier the climate and the soil become, so that in the upper part of India and in the Central Provinces the maximum prevalence of the disease occurs just at those periods when the soil-conditions most closely approach those in Calcutta when in its driest state, viz., during and towards the end of the rains, at which period alone the soil-conditions of the former area approximate to those in Lower Bengal during the greater portion of the year. After bestowing the most careful consideration on this matter, and after endeavouring to examine it in all its phases, we have

come to the conclusion that the theory which regards conditions of the soil as essentially determining the production of the cause of cholera in a locality is much more in accordance with the phenomena of its seasonal prevalence as manifested throughout the Bengal Presidency than any of the other doctrines appear to be.

Conclusion.—In manifesting a marked partiality for a soil of the character of the Gangetic alluvium, cholera is by no means singular, for it is a well-established fact that malarious fevers and kindred diseases flourish with most vigour about the deltas of large rivers all over the world.

The connection between soil and malaria, as a connection implying cause and effect, is not seriously questioned, and the apparently capricious manner in which some districts evolve it and others do not is a well-recognised fact: swampy and arid soils alike being capable of producing the miasm during certain seasons.

In this, malaria presents a considerable resemblance to cholera, for although both affections manifest a marked tendency to become endemic in alluvial districts, there exist, nevertheless, very numerous localities, even in tropical and subtropical climates, where both affections are unknown, such, for example, as the extensive swampy districts in South Australia. That cholera also is unknown there is commonly attributed to the circumstance that India is too far removed to allow of the transport of infectious material, but no one has as yet attempted to explain the absence of malaria on such grounds.

We would not, however, be understood to imply that the causes productive of malarious fevers and cholera are identical, or that localities providing the conditions necessary for the development of the one must therefore provide those for the other also.

There are malarious localities of the most pronounced type where cholera has never flourished, notwithstanding that cases of the affection have been brought there, and fatal cases too. Of these probably no better example could be cited than the large convict settlement at the Andaman Islands, where cholera has never thriven, notwithstanding the fact that it is within three days of India and twenty-four to thirty-six hours of

Burma, and that during the last twenty years steamers have constantly passed between the two countries and the settlement. A steamer laden with convicts proceeds to Port Blair (the only port in the islands) from Calcutta every four weeks, and cholera cases have on some occasions been imported and have died after landing; but it is only on rare occasions that cases of cholera have been registered as occurring in any part of the settlement.

Dr. Rean, the late principal medical officer to the settlement, however, in his annual report for 1870 (quoted by Dr. C. Macnamara, *op. cit.* page 236), describes cases of the following character:—

"The patients were generally admitted from some feverish locality or had been employed on works of an unhealthy character. They were taken ill somewhat suddenly; the most urgent symptoms being frequent purging and vomiting with great prostration. The alvine evacuations bear a resemblance to curds mixed with bloody serum, and the vomited matters were a light-coloured watery fluid; the countenance pinched, voice hoarse and husky, tongue pale, and breath cold, the extremities of the fingers and toes puckered, pulse not perceptible, and the surface of the body cold and clammy. The patients suffered from cramps of the stomach and extremities, and had great thirst; respiration was much restrained, causing extreme anxiety and a presentiment of approaching death; in most cases the urinary secretion was suspended. The only diagnostic sign to distinguish the disease from cholera was the character of the stools, and they sometimes approached the conjee-like character of choleraic evacuations."

During a visit to the Andamans in 1872 one of us had an opportunity of witnessing a case of this kind. In this instance the rice or conjee-water character of the evacuations was very evident, together with every other characteristic symptom of cholera, including suppression of urine. Dr. King, the surgeon-major in charge of the hospital, had witnessed several such cases, but had hesitated to return them, whether fatal or otherwise, as cholera, because there was no general diffusion of the disease among the convicts.

The importance of well-authenticated records of cases of this character can scarcely be overrated in connection with the etiology of cholera. Questions of possible contagion or of water-contamination by a specific material can hardly be seriously entertained here; there can be no casual importation of cases among an isolated community of this character, as the recent history of every person landed is accurately known. Somewhat similar cases habitually occur in every city in India,

as well as every summer in nearly all the large cities of Europe. These, however, excite no special comment unless an epidemic breaks out in any part of the country; on this the previously-ignored cases are carefully collated and described as the starting-points of the pestilence: it is not the custom to look upon such cases *then* as due to a localised generation of the disease.

That in the present state of our knowledge of the subject it may appear difficult or impossible to explain all the phenomena of the distribution of cholera by coincident conditions of the soil must be at once allowed. But at the same time, when we come to inquire into the point, we find that just as many difficulties present themselves in reference to malarial affections.[1] Whilst generally associated with moisture of air and soil, they also occur in certain localities, which might have been regarded as quite incapable of furnishing the conditions for their production. In some of these cases, such as the oases in the Sahara, the unfitness may be only apparent, and, on closer inquiry, conditions may be demonstrated, calculated to produce the result. In others, however, no satisfactory explanation can be afforded. The telluric origin of the cause producing the symptoms of malarial poisoning is not, however, on this account doubted, and if this be so there is no sufficient reason for doubting the telluric origin of the cause of cholera in similar exceptional cases.[2]

[1] "Malaria sometimes breaks loose from its endemic haunts and shows itself in places where it has seldom or never before appeared. It thus loses its endemic character and sweeps over considerable regions of country as an epidemic or over vast sections of the globe as a pandemic. . . . In view of what has been said before, it does not seem probable that currents of air are capable of carrying the poison which is generated in the breeding-places of epidemics to a distance of any considerable number of miles. We believe rather that malarial poison is, in the majority of cases, generated on the spot. . . . It is a still more difficult matter to account for those isolated areas of malarial poison which are often confined to a single street, or to one side of a street, or even to single houses, unless, indeed, supposing them to arise from subterranean swamps and collections of water, the exhalations from which reach the surface through rifts in the ground."—H. Hertz on "Malarial Diseases" in Ziemssen's *Cyclopædia of Medicine*, 1875, p. 578.

[2] "No chemist has yet been able to demonstrate the existence of malaria. We assume its existence from certain observed effects on the organism just as we do in the case of other poisons which produce certain specific diseases. Malaria is believed to be the product of organic decomposition in soils, whatever may be their mineral composition; water is indispensable to the process, and a high temperature, although not absolutely necessary, greatly aids it. . . . It is often

Not only do we observe marked parallelisms between cholera and malaria in the capriciousness manifested by the apparently very opposite conditions of soil in which the diseases are sometimes observed, but also in the manner of their diffusion. It is a matter of common experience that removal from a locality in which cholera exists is a remedy against the spreading of the disease, and the government of this country has, for many years past, acted on this knowledge with regard to its troops and prisoners with the greatest benefit. It is equally a matter of experience to find the population of one part of a district suffering severely from fever, whereas others are practically exempt, without any very evident difference in the localities being observable; and, just as in the case of an outbreak of cholera, how often has it not been observed that crossing to the other side of a river or shifting a ship a few hundred yards from where it had been at anchor, has sufficed to put an end to a regular epidemic of malarious affections? With regard to both affections tracts of country which suffer in one season are exempted in the next, whilst districts formerly exempted are in their turn attacked: at the same time, the two diseases manifest a decided predilection to attack some localities at all seasons.

It is not uncommon to find that cholera is described as passing over large tracts of country, either with the wind or in its teeth, according to the particular views entertained by the writer, leaving the impression on the mind of the reader that some pernicious influence had passed over the land. But is it not a fact that cholera, instead of spreading itself over the country on any systematic, geographical plan, often appears simultaneously in districts perhaps a thousand miles apart? Does it not seem more reasonable to infer that the disease was generated at or near the place of its occurrence in the same manner as outbursts of malarious fevers?

found in sandy soils and arid-looking plains, devoid of vegetation; but in all such cases the soil will be found to contain a considerable portion of organic matter, and water will be found not far from the surface, either in the shape of subterraneous streams, or detained by a bed of clay below the sand. . . . Malaria is also generated in hard rocks such as granite and trap, in a disintegrating state. A notable example is the island of Hongkong, which consists entirely of weathered and decaying granite."—W. C. Maclean on "Malarial Fevers" in Reynolds' *System of Medicine,* 2nd edit., vol. i. p. 591.

There is nothing more remarkable in the production of an attack of cholera than in the production of an attack of ague: in some respects, indeed, the latter is the more remarkable of the two, seeing that once acquired the symptoms may recur at long periods after the original attack and without subsequent exposure to the influences that originally produced it. It is true that although malarious fevers are not so appallingly fatal as cholera, nevertheless it has not been always so. During periods when cholera was either unknown in Europe or a far milder form alone of it prevailed, malarial fevers almost depopulated whole tracts of country—many parts of England suffered terribly, and Sir Gilbert Blane states that the mortality in London from ague during 1558 was so great that the living could not bury the dead.

We would not for a moment have it supposed that we consider the two affections as mere gradations of the same disease; all that we desire to urge is that cholera has as good a claim as malarial diseases to a telluric origin. What the essential cause may be remains unknown in both cases; but the fact that the production of malaria is so greatly under the control of improvements in local conditions warrants us in looking confidently to similar results with regard to the cause of cholera also.

THE PRACTITIONER.

JUNE, 1878.

Original Communications.

ON THE EMPLOYMENT OF THE OXALATE OF CERIUM IN PREGNANT SICKNESS.

BY FRANCIS EDWARD IMAGE, M.A., M.B., CANTAB.

The interesting account published in your extracts from foreign journals, in the last number of the *Practitioner*, of the utility that ingluvin has met with in moderating and restraining the vomiting of pregnancy at the hands of Dr. Frowert, leads me to put in a plea for a drug that has of late years much fallen out of use. Sir James Simpson introduced the oxalate of cerium, and prescribed it in ten-grain doses. The officinal dose is from one to two grains, which is as a rule so useless that the preparation has been stigmatized as the "oxalate of mud." As a general practitioner of seven years standing, very many cases of pregnant-sickness have naturally come under my care, and up to the present time I have not met with a case in which the nausea has not been very considerably relieved, and in most cases completely checked, by ten-grain doses of the oxalate of cerium. I have at the time of writing this a lady under my care, who from the fourth week of her pregnancy till now, the eighth month, has suffered at intervals from this distressing symptom, but whose sickness has been invariably checked by from two to three days' administration of the oxalate in the

dose I have mentioned. In severe cases I give it every four hours for the first day, beginning the first dose half an hour before the patient rises, and then, as improvement takes place, diminishing it to three times a day, but always giving the first dose of the day before the patient moves from the horizontal position—a point to which I attach much importance. The formula I employ is,

℞ Cerii oxalatis, grs. x.
Pulv. trag : co. grs. x.
Tre. aurantii, ʒss.
Aquam ad., ʒi. M.f.m.

In Dr. Frowert's case, he prescribed 1½-grain doses, which were "not followed by the slightest remission of symptoms." I hold that this want of good result was from the insufficiency of the dose.

The oxalate of cerium I have also found most efficacious in restraining the nausea resulting from uterine irritation. I generally combine it with bromide of potash in these cases, but have found it succeed in combination where the previous employment of the latter drug by itself has been without appreciable effect.

A CASE OF BLEPHAROSPASM WHICH RECOVERED UNDER TREATMENT.[1]

BY THOMAS BUZZARD, M.D.

Physician to the National Hospital for the Paralysed and Epileptic.

THERE is no one probably whose treatment of muscular spasm is so entirely successful that he will be indisposed, on that account, to hear of a case in which a rather rapid recovery followed the measures adopted for its relief. For my own part so little success comparatively has fallen to my lot in the management of this class of disorder, that I perhaps over-estimate the interest and practical importance of the case which is here related. But I have failed to find in works upon the subject any reference to the particular mode of irritation of the fifth nerve which the result of treatment showed was the immediately exciting cause of the spasm in this instance, and it is, therefore, possible that some service may be rendered by placing the facts upon record.

The patient applied to me a short time since on account of spasm of his left eyelids. At uncertain intervals the orbicularis palpebrarum muscle of the left side was spasmodically contracted, the eye being closed firmly for a few seconds. There was besides a frequent winking of this eye between the occurrences of the more severe spasm. He was a married man, 53 years of age, who was engaged in commerce, and had enjoyed an unusual amount of good health. There was nothing in his family history or personal surroundings to suggest a cause for the disturbance of function which he presented. He had not been exposed to any draught of cold air, or received any injury; he had no facial neuralgia, and his teeth were good.

[1] A Paper read before the Harveian Society of London.

It seemed that one evening about two months previously he had suddenly felt a twitching in the left eyelids, which was accompanied by what he describes as a "numbing feel" about the left temple and ear. The next morning as soon as he began to eat his breakfast he got repeated spasmodic closure of his left eye accompanied by a sensation of dragging in the neighbourhood, which was very uncomfortable. And so this went on. Whenever he began to talk or to eat, or if he got excited about anything, there came a rapid succession of forcible closures of his eye for a few seconds. The result was that he shrank from talking for fear of starting the spasm, and that his nervous system generally had begun to be a good deal upset by the worry of this continually recurring trouble.

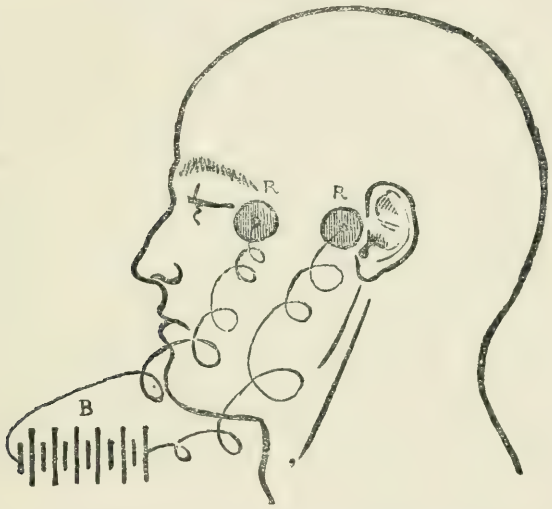
Asked as to any possible source of irritation at a distance, the only thing he could suggest was that within the preceding three or four months he had taken to wearing a truss which had occasioned him, as it often does when commenced somewhat late in life, a good deal of discomfort, until he got properly fitted.

Nothing likely to beget irritation presenting itself in his eye or mouth, I next proceeded to examine the face for "pressure-points," *i.e.* for spots, pressure upon which would stop the spasm. No response followed pressure over points corresponding to the infraorbital, supraorbital, inferior maxillary, or subcutaneous malæ nerves, but on approaching the ear I found that when my finger was firmly pressed upon the tragus, and also on the skin for about an inch in front of it, the spasm ceased to take place so long as the pressure was continued, immediately recurring, however, and apparently with more than usual violence, when the finger was lifted. This observation drew my particular attention to the patient's ear. There was no deafness noticeable in conversation, but I noted that whereas he could hear Galton's whistle 8° with his right ear, he could only distinguish 5° with his left.[1]

[1] The whistle referred to was one of a kind invented by Mr. Francis Galton, F.R.S., for determining the upper limits of audible sound in different individuals, and exhibited by him in the Loan Collection of Scientific Instruments at South Kensington in 1876. By turning a screw the rapidity of the vibrations, and consequently the height of the emitted note, is increased, until a point is reached

It appeared, too, that along with the numbing feeling complained of by him, there was an indescribable sensation within the ear, which the expression "singing" did not fairly designate. Examination with the ear speculum disclosed the presence of wax in the meatus, which was removed in large quantities by syringing. A feeling of increased comfort followed the discharge of the wax, but there was no appreciable diminution of the spasm.

I now applied the constant current from a Stöhrer's battery (B), placing one sponge rheophore (R) (salt-water wetted) just



in front of the tragus and the other behind the outer canthus, employing six cells (the battery had been quite recently renewed), and continuing the application during ten minutes. No attention was paid to the *direction* of the current, as experience has shown me that this is not important. The strength was lowered gradually to zero ere the sponges were

at which human ears cease to be sensitive to the impression. I obtained the instrument from Messrs. Tisley and Spiller about a twelvemonth since, and they at my request engraved upon it a scale numbered from 1 to 10. Rough as this is it is convenient enough as an arbitrary record of the degree of sensitiveness to high notes; and I am constantly employing the whistle for this purpose. The graduation has since been made very much more minute, and so arranged that the number of vibrations per second, corresponding to a particular tone, can be arrived at by a simple calculation.

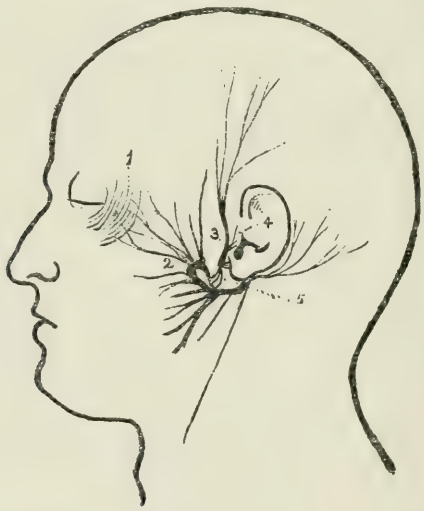
removed, in order to avoid shock. A burning, not unpleasant, feeling was described as accompanying the application, and a good deal of redness of the skin remained after the removal of the rheophores. During the process the spasm of the lids was so greatly reduced in amount that it was scarcely perceptible, but it returned with force when the current ceased to be applied. When I saw the patient four days afterwards his condition had materially improved. There was only an occasional twitching of the lids, and he had quite lost the feeling of the eye being dragged down. The application of the current was repeated in the same situation. In three days more there was still further improvement, the spasmodic twitchings having ceased, and there being only a little, though constant, fine tremulous movement of the skin of the upper eyelid—that kind of peculiar localised tremor, indeed, to which the name "live blood" is given. The numbness or deadness about the left ear of which he had complained, had spread, he said, over the back of the head, and even as far round as the right ear. One of the rheophores was applied to the eyelid with the effect of stopping the tremor apparent there. The application of a blister behind the left ear was followed by still further improvement; and when I saw the patient for the last time, a few days afterwards, he was going into the country, having nothing left to complain of except a very slight feeling of live blood in the lid. The hearing had improved in both ears; with the left he heard Galton 7°, with the right 9°.

Remarks.—It is known that a great many different sources of irritation of the fifth nerve may give rise to partial or diffused facial spasm. The most common example is doubtless shown by the effect of a grain of sand upon the conjunctiva in producing a very marked tonic spasm of the lids. In such a case it happens that the action is attended by pain, but this is of course not necessary, reflex action taking place quite independently of consciousness. It is this circumstance, indeed, which usually makes the search for the source of irritation difficult, and but too often unsuccessful. To von Graefe we are especially indebted for indicating the frequency of the pressure-points and the variety of situations which they may occupy. They are not necessarily confined to the surface of the face. Von Graefe

mentions a case of bilateral blepharospasm in which pressure upon the left glossopalatine arch cut short the spasm. At this point there was an ulcer, and when this healed the spasm ceased. In an obstinate case which came under my own care in hospital practice about two years ago the source of irritation was in the fifth nerve, but it was unfelt. Mr. Brudenell Carter, to whom I sent the patient, divided both subcutaneous malæ nerves, having found that pressure upon the points corresponding to these temporarily checked the spasm. The patient, whom I see from time to time, remains nearly free from spasm. A short time since I saw a severe example in a gentleman, upon whose chin in the neighbourhood of the emergence of the inferior maxillary nerve there was a cicatrix adherent to the bone. The spasm had commenced a few months after the infliction of a wound in this situation, into which some paint had entered. Pressure upon this point having been found to check the spasm, I recommended free subcutaneous division of the cicatrix down to the bone, and sent the patient with a note to a surgeon for the purpose. He did not, however, go, being probably quite incredulous as to the possible connection of a scar upon the chin with a troublesome ailment of his eyelids. In another case, that of a maid-servant who was sent to me, the cause appeared to lie in a stump of a tooth, but I did not hear the result of the removal, which was advised. I have lately seen a lady who suffered from an extremely painful condition of the fifth nerve (its two first divisions) upon one side of the face resulting from a *coup de vent.* Whilst the photophobia, which was one symptom of the irritation of the fifth, endured, there was great tendency to blepharospasm, which ceased when the irritable state of the nerve gave way to anæsthesia. If we may judge by what takes place in regard to muscular spasms in other regions, it is possible that in those cases of facial spasm in which no pressure-point about the district of the fifth nerve can be discovered, there may be a source of irritation affecting a distant nerve; and there appears to be evidence to show that this has sometimes been the case, facial spasm having coincided with the presence of worms in the intestinal canal, and ceasing on their removal. I have lately been seeing in consultation a young lady with a remarkably violent and rhythmical convulsive

movement of muscles jerking the left shoulder forwards and backwards, in whom somewhat heavy pressure upon the left ovarian region was observed to put an entire stop to the spasms during its application. The effect of pressure upon various other points was tried in her case, but without result.

The cause of irritation in the case related above—a large plug of wax in the meatus auditorius—is probably not a frequent one, or cases of facial spasm would be much more common than they are. It is one, however, which is very liable to be overlooked, unless either a complaint is made of deafness, or the observer's attention is accidentally called to the condition of the ear. Yet



1. Orbicularis palpebrarum.
2. Portio dura (motor).
3. Auriculo-temporal nerve (sensory).
4. Its auricular branches.
5. Its branches of communication with the portio dura.

the intimate association between the nervous supply of the meatus and that of the muscles of the face would seem to suggest a peculiar liability for spasms to be occasioned by irritations of this passage. I have here drawn a rough diagram to illustrate this association. It will be observed that the auriculo-temporal division of the fifth emerging from between the jaw and the ear sends at once communicating branches to the portio dura. The

branches to the meatus auditorius spring from the point of connection of these two nerves, whilst the auricular branches are distributed in the integument covering the tragus and the pinna above the external auditory meatus. There are besides branches to the temporo-maxillary articulation, and it was doubtless to the excitement of these by movements of the jaw that was due the invariable recurrence of spasm when the patient began to eat or talk. The dragging sensation experienced by the patient must be referred to the exaltation of irritability of the fibres from the auriculo-temporal nerve which accompany those of the portio dura to the face. Whether the point of reflexion from irritation of the sensory nerve was in the medulla oblongata, or in the periphery (otic ganglion ?) must remain, I think, doubtful. Pressure upon the points marked × in the diagram would most affect the auricular branches of the auriculo-temporal nerve,

but also incidentally, by squeezing the cartilaginous structure, those distributed to the interior of the auditory meatus. It would thus probably "cut" the communication of centripetal impulses.

It is difficult to allot the degree of utility due to each of the different steps of treatment adopted in this case. The most important, probably, was the removal of the wax, and it is possible that in time, after this had been effected, the disorder would have subsided without further interference. But it is worth remembering that whereas no cessation of spasm immediately followed the discharge of the wax, the passage of a continuous current between the points occupied by the rheophores, and which are marked in the first diagram, was sufficient to put an immediate stop to spasmodic contractions. I think it reasonable, therefore, to ascribe to the use of Voltaism the

rapidity, at least, with which the recovery of this patient took place. I am disposed also to think that the blister bore no unimportant part in quieting the irritability of adjacent nerves. What vesication is capable of doing in this way we see every day in cases of neuralgia and neuritis. One point besides must not be overlooked. The treatment here was adopted at a comparatively early stage ; the patient, it is true, had suffered for two months, but the affection was still limited to one side, and for the most part to the orbicularis palpebrarum, although there were probably slighter twitchings in neighbouring muscles. It is my misfortune usually to see cases of muscular spasm for the first time when they have existed for many months, or, still more often, years, and when the disease has proceeded to involve a much larger area than that which it had occupied in an earlier and more tractable stage.

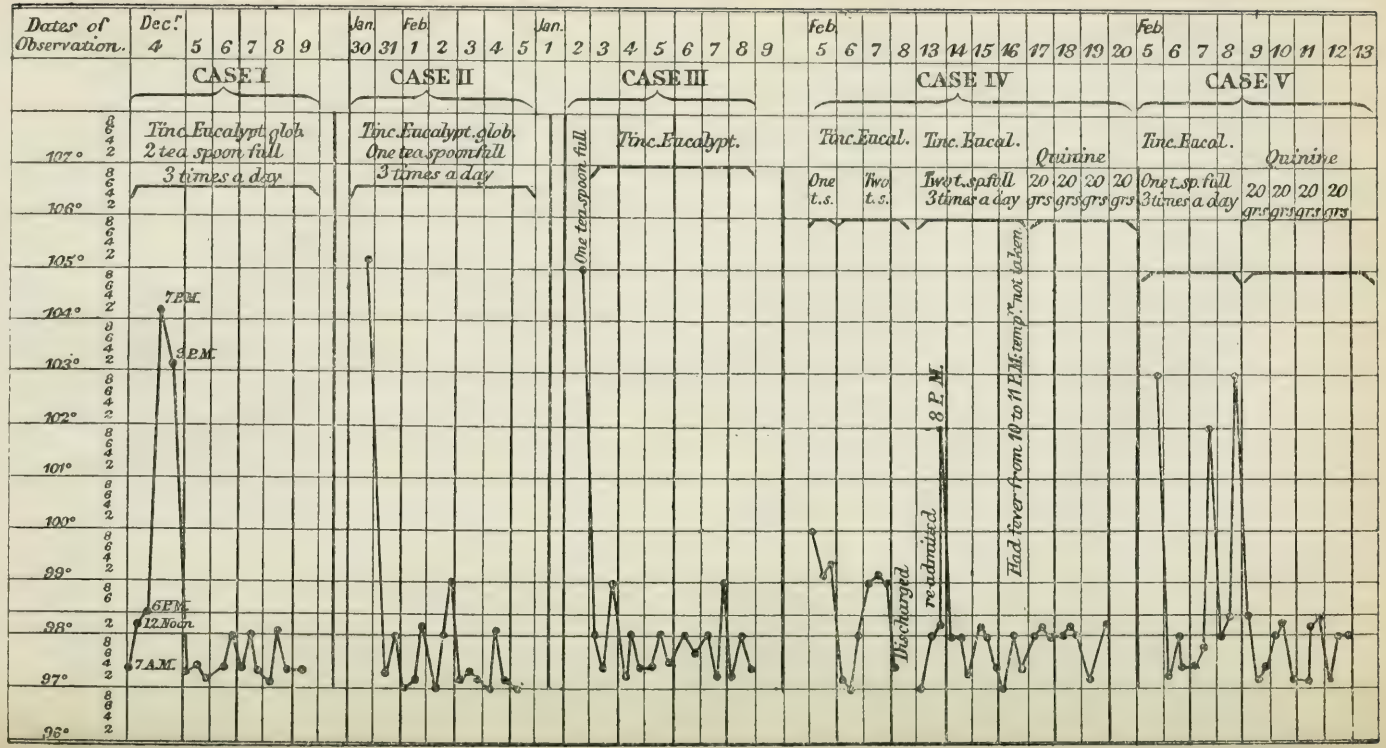
ON TINCTURE OF EUCALYPTUS IN AGUE.

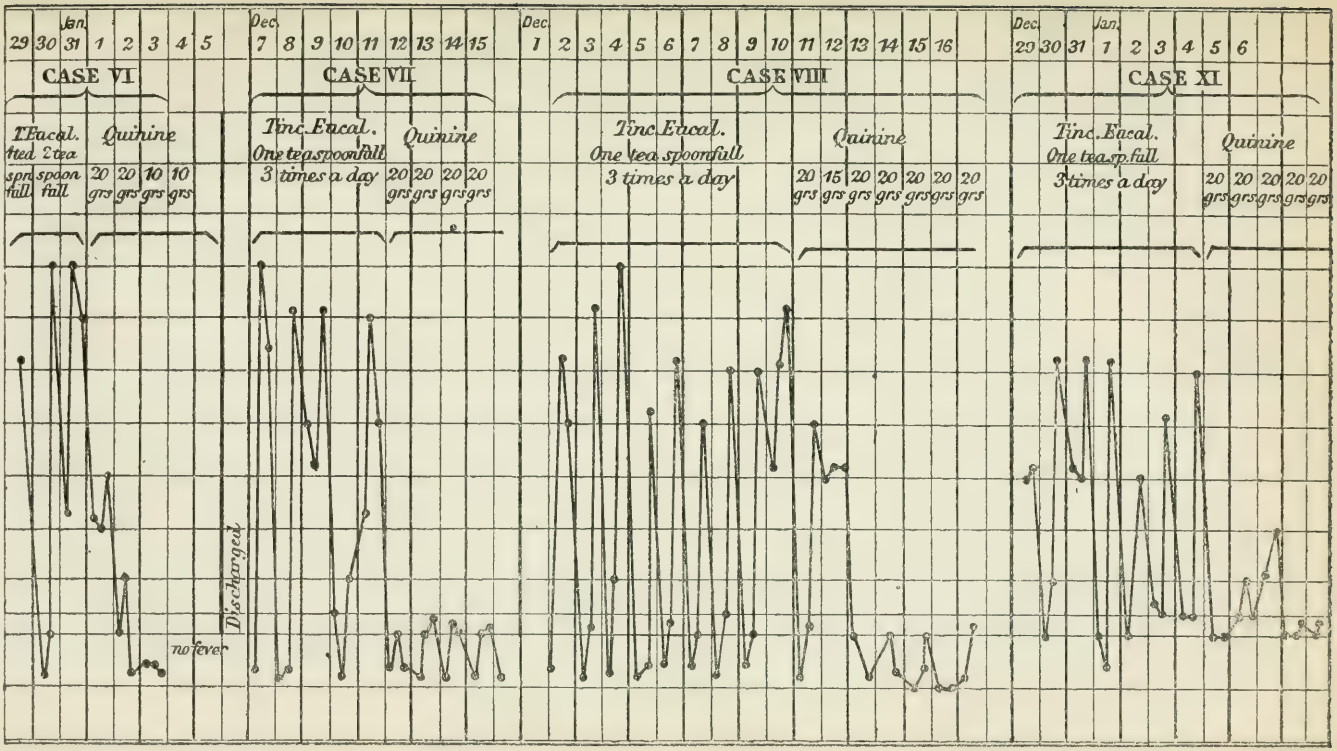
BY H. P. ROBERTS, M.D.,

Surgeon H.M. 9th Regt. N.I., Baroda.

With reference to two cases of ague treated with eucalyptus globulus by Dr. John Curnow, published in the *Lancet*, 30th September, 1876, and a notice on the subject in the *Practitioner* for May, 1877, it is possible that you might consider as interesting the results obtained in the following cases of intermittent (malarial ?) fevers treated with the tincture of eucalyptus globulus, with a view to ascertain its efficacy, or otherwise.

Upwards of twenty cases of ague, admitted during the months of December, January, and February 1876-77, were treated with the tincture, which was obtained from the best chemist in Bombay. During this period a supply was obtained on three several occasions, so that even should one supply have become inert or lost any properties as a febrifuge which it should have possessed, it is scarcely likely that they all should have done so. Moreover, cases I. and VII. were under treatment about the same time, and were taking the tincture from one supply, and the results were very dissimilar. Only nine of the twenty cases treated gave sufficiently satisfactory results to be produced as evidence either way. As may be seen in the accompanying charts all these cases were treated on admission with tincture of eucalyptus globulus, and in those cases in which the drug appeared inert, quinine in large doses (fifteen to twenty-five grains) was given, after a period when it really became injudicious to allow the fever to recur so often, and when the temperature rose, notwithstanding the administration of the eucalyptus globulus.


Dates of Observation.
Dec.r 4 5 6 7 8 9
Jan. 30 31 Feb 1 2 3 4 5
Jan. 1 2 3 4 5 6 7 8 9
Feb. 5 6 7 8 13 14 15 16 17 18 19 20
Feb. 5 6 7 8 9 10 11 12 13
CASE I
CASE II
CASE III
CASE IV
CASE V
107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
97°
96°
Tinc. Eucalypt. glob. 2 tea spoon full 3 times a day
Tinc. Eucalypt. glob. One tea spoonfull 3 times a day
One tea spoon full
Tinc. Eucalypt.
Tinc. Eucal.
One t.s.
Two t.s.
Tinc. Eucal.
Two t.spfull 3 times a day
Quinine
20 grs
Had fever from 10 to 11 P.M. temp.r not taken
8 P.M.
Discharged
re-admitted
Tinc. Eucal.
One t.sp full 3 times a day
Quinine
20 grs
7 P.M.
8 P.M.
6 P.M.
12 Noon
7 A.M.


Dec. 29 30 Jan. 31 1 2 3 4 5
CASE VI
Tinc. Eucal. 1 teaspoonful 2 teaspoonfuls
Quinine 20 grs 20 grs 10 grs 10 grs
no fever
Discharged
Dec. 7 8 9 10 11 12 13 14 15
CASE VII
Tinc. Eucal. One teaspoonfull 3 times a day
Quinine 20 grs 20 grs 20 grs 20 grs
Dec. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
CASE VIII
Tinc. Eucal. One teaspoonfull 3 times a day
Quinine 20 grs 15 grs 20 grs 20 grs 20 grs 20 grs 20 grs
Dec. 29 30 Jan. 31 1 2 3 4 5 6
CASE XI
Tinc. Eucal. One teaspoonfull 3 times a day
Quinine 20 grs 20 grs 20 grs 20 grs 20 grs

The temperatures were taken usually at 6 A.M., 12 noon, and 7 P.M., except where specially indicated.

There were no great variations in the diets of the patients, which were observed in some fifty cases, and which were invariably below the amount laid down by Parkes as sufficient for a European at rest. With regard to cases I., II., and III., one of which was quotidian ague, the remedy was apparently successful, but the remainder, taken collectively, seem so pointedly to indicate that there was no cure until quinine was given, that I should not be inclined to value the tincture of eucalyptus globulus as a useful internal remedy.

In case IV. the patient had fever on the evening of the 4th, missed the next attack, was discharged, and said he escaped the usual attack on the 10th, but he, at my request, came to hospital to be under observation on the 13th, when he had an attack, and also slightly on the 16th, but after that he had no more. And I cannot recollect that he has presented himself at hospital since that time.

There is no evidence to show that in the majority of cases the attacks were on the wane and that quinine was administered at a favourable opportunity.

These cases have only recently been separated from a number which were treated at this time with different anteperiodics or febrifuges, so that the cases selected for trial with the eucalyptus globulus were quite indiscriminate.

ON THE USE OF CHRYSOPHANIC ACID IN PSORIASIS: WITH NOTES OF SIX CASES IN WHICH IT WAS EMPLOYED.

BY J. C. OGILVIE WILL, M.D.,

Surgeon to, and Lecturer on Clinical Surgery at, the Aberdeen Royal Infirmary.

THE results obtained in the following cases of psoriasis from the use of chrysophanic acid ointment have produced so strong an impression upon my mind regarding the efficacy of this mode of treatment, that I gladly comply with a wish expressed to me by Mr. Balmanno Squire that I should lay the particulars of them before the profession. Five of the cases were treated in my wards in the Aberdeen Royal Infirmary, the sixth was a private one. The effects of the remedy were watched with great interest by a large body of students, and I had also the pleasure of showing some of the patients to several brother practitioners, who all expressed themselves as feeling gratified with, and not a little astonished at, the rapidity of the progress of the cases, and the excellence of the results attained.

CASE I.—J. W., aged fourteen, was admitted on April 25 1877, suffering from psoriasis. The arms, thighs, and legs were covered with innumerable scaly patches, varying in size from a minute point to that of a shilling, and presenting the characteristic appearances of *P. punctata, guttata,* and *nummularis,* most marked on the extensor aspects, but also involving a considerable extent of the flexor aspects. His chest, abdomen, and back were very plentifully studded with nummular patches, and his scalp was in a similar condition. He complained of intense itchiness. On April 28, chrysophanic acid ointment—fifteen grains to an ounce of hot lard—was prescribed, directions

being given that it should be well rubbed into the affected parts night and morning. Three days afterwards the scales were peeling off freely, and the itching had ceased. On May 3 the scaly patches had completely disappeared from the greater portion of the surfaces involved, and the infiltrated cutis was fast resuming its normal consistence. On May 7 the whole body was perfectly free from scales, and was dyed of a dusky purple colour; while the spots where the disease had existed presented a smooth, white appearance, forming a marked contrast to the surrounding discoloured skin. The head was shaved on May 3, for the purpose of allowing the application of the ointment to the scalp; but the shaving caused so much irritation that the use of the acid was delayed until May 9, when it was applied, the effects on the eruption being similar to those seen after its application to the body. On May 10 the epidermis covering the unaffected portions of the body was found to be exfoliating, the whole surface being covered by fine furfuraceous scales; but after the use of warm baths, the skin speedily became perfectly normal in appearance, no trace of disease remaining. For the purpose of observation, the patient was kept in hospital for some time longer, and on one occasion it was deemed expedient to reapply the ointment to his back, which presented a somewhat suspicious appearance, but on June 4 he was dismissed with a perfectly healthy skin. As a precautionary measure, he was directed to take small doses of Fowler's solution for a few weeks.

Case II.—J. B. (male), aged seventeen, became an inmate of the Aberdeen Infirmary in July, 1877. He was the subject of well-marked nummular psoriasis of eighteen months duration. The patches were comparatively small in size, the largest being a little larger than a shilling; but they were abundant, the legs, arms, fore-arms, abdomen, and back being freely studded with them. The pearly-white appearance of the heaped-up epidermic scales was exceedingly well marked, but the thickening of the corium was less than usual. Chrysophanic ointment was prescribed. After the fifth application the scales were found to be much less firmly attached than before, and on the sixth day after treatment was commenced most of the scales had become completely detached, and those that remained were loose, and easily rubbed

off by the use of slight friction. Two days afterwards the whole of the scales had disappeared, and the infiltration was much lessened. He was directed to have a warm bath, and to continue the ointment. In less than three weeks after the commencement of treatment, every trace had disappeared, his body presenting the usual appearance observed after the use of this remedy—viz., white circular and oval patches of perfectly supple skin, occupying the points previously infiltrated and covered with scales, while the parts uninvaded by disease had assumed a prune-juice colour from the effects of the acid upon the normal integument.

Case III.—M. G. (female), aged seventeen, sent to my care by Dr. Brander, admitted on October 26, 1877, suffering from *psoriasis diffusa*. She stated that she first observed the eruption on her knees about six months previously, the disease spread rapidly, chiefly affecting the extremities.

Condition on Admission.—On the left leg the largest patch, situated right over the knee, measures $3\frac{1}{2}$ inches in length by $3\frac{1}{4}$ in breadth; it is plentifully covered with large, thick, pearly-white, firmly adherent scales, and the skin is much reddened, and thickened. Immediately above the knee there are three patches about the size of a shilling, and all over the anterior aspect of the leg there are patches varying in size from small spots to that of a half-crown piece. Right leg: a large patch of irregular shape, $3 \times 3\frac{1}{4}$ inches in size, over the knee, and another, $3\frac{1}{4} \times 2\frac{1}{4}$ inches, below the patella; numerous patches of smaller size on front, sides, and calf. Left arm: over elbow long patch measuring $5 \times 1\frac{3}{4}$ inches, and many smaller spots on arm, fore-arm, and hand. Right arm: on posterior and outer aspect of arm large patch measuring $3\frac{1}{2}$ inches in length, and the same in breadth; another over elbow-joint extending down fore-arm $6 \times 2\frac{1}{2}$ inches in size, and another large one on the back of the hand. Many small patches scattered over the fore-arm. In all the larger patches redness and thickening of the corium excessive. Treatment was commenced on Oct. 27 with chrysophanic ointment.

Nov. 1.—Scales beginning to fall off from larger patches—lesser ones quite free from them. *Nov.* 3.—Infiltration of smaller patches much lessened; still some scales adherent to larger ones

Unaffected skin dyed deep red colour. *Nov.* 6.—All the scales have disappeared; infiltration much diminished. *Nov.* 10.—Smaller patches beginning to assume characteristic white appearance; skin soft and pliable. Infiltration of larger patches disappearing, but still very manifest. Directed to have warm bath; strength of ointment to be increased to twenty grains to the ounce. *Nov.* 19.—Redness of patches quite dissipated; still some thickening. To have a bath. *Dec.* 1.—No trace of eruption on any part of body. (For the notes of the above case I am indebted to Mr. G. Rae, M.A.)

Case IV.—A girl, aged twelve, who had been admitted suffering from ranula, was found to be affected by psoriasis, her legs, knees, and arms being plentifully covered with small scaly patches. Duration unknown. Chrysophanic ointment was prescribed, and was applied night and morning for ten days, when the disease had completely disappeared, and the patient wa dismissed from hospital.

Case V.—C. D. (female), aged thirteen, recommended by Dr. Brander, suffering from *P. nummularis*, especially affecting the knees and elbows, but also involving to a considerable extent the rest of the body. The disease had only been observed for six weeks, but was exceedingly well-marked. The patches varied in size from that of a mere point to that of a five-shilling piece; infiltration considerable, especially in the neighbourhood of the knees. The usual ointment was prescribed. Progress was exceedingly rapid; for at the end of a week all the scales had exfoliated, and the thickening had much abated; and at the end of three weeks she was discharged from hospital quite well, the whole skin being perfectly normal in appearance and consistence.

Case VI.—A. G., grocer's assistant, aged twenty-two, consulted me on November 13, 1877, concerning psoriasis, from which he had suffered for many years. When stripped the parts found to be most affected were the front of the legs, upper part of thorax, and fore-arms, where many patches varying in size and shape, but mostly about the size of a half-crown piece, and circular in outline, were observed. The face and neck and the dorsal aspects of the hands and wrists were studded with smaller spots; and these spots, from the prominent situations they occupied, gave the

patient much annoyance. Nummular patches were also found on the abdomen, back, and other parts. The scalp was also affected. There was much thickening of the skin, but very little redness.

Chrysophanic ointment—twenty grains to the ounce—was prescribed. This was freely rubbed into the whole body night and morning. The scales speedily became partially detached, and soon commenced to exfoliate; but after the ointment had been used for ten days, considerable inflammatory redness of the skin, accompanied by heat and tingling, set in. These symptoms were specially noticeable in the axillæ and groins, where the skin was very much inflamed, and markedly hotter to feel than normal. The skin covering the front of the chest and abdomen was also hot, red, and tender. The other parts of the body were deeply tinged with the acid—the face being dark brown—but they were not irritated. He was directed to take a warm bath, to discontinue the use of the application to the parts most affected by redness, to apply the ointment carefully to each diseased patch, and to avoid inunction of the surrounding skin. The heat and tingling were much relieved by the bath, and in the course of a few days the inflammation subsided. This was followed by complete exfoliation of the epidermis covering those parts of the body where the dermatitis had existed, the epidermis peeling off in large thin flakes; and the same process took place on his face, but it was slower, and the exfoliation was furfuraceous in character. At the end of three weeks from the commencement of treatment nearly every trace of disease had disappeared; the small spots on the wrists were the most obstinate, for at this period (Dec. 3), although the infiltration of the larger patches was completely dissipated, a very slight degree of undue thickening was still discernible at the points referred to.

On December 3, when the patient last presented himself, no trace of disease remained on those parts to which the remedy had been applied. He was enjoined to take arsenic as a prophylactic, and for the cure of the patches on his scalp to which the ointment had not been applied, for as he was on the eve of sailing for a foreign country he was unable to carry out the treatment of the *psoriasis capitis*, as I declined to allow him to apply the ointment to his head without the hair being first removed.

It will, I think, be allowed by all that the mode of treatment adopted in the foregoing cases was rapid in its effects, and satisfactory in its results; I therefore consider it unnecessary to occupy space with remarks on the progress of the cases, more especially as I have in the more aggravated ones given the details both as regards the extent of the disease and the effects produced by treatment at considerable length. One point, however, seems to me to be deserving of special notice—viz. the strength of the ointment employed, as it may be observed that instead of thirty grains to the ounce (the most usual strength prescribed), half that quantity of the acid was found sufficient. This is a matter of some moment, as the remedy is a somewhat expensive one, and when used in a concentrated form it is extremely irritating, especially to some skins, as was shown by A. G.'s case, where a somewhat stronger preparation was employed; as the weaker ointment seems to be all-sufficient, it should receive the preference, increasing the proportions of the acid should any case be so aggravated and obstinate as to call for that procedure.

Regarding the lastingness of the cure, I am unable to supply any data, but of its permanence I am somewhat sceptical, for experience has shown that, even in cases treated by internal remedies, such as arsenic, unless the medicine be continued for a long period after every vestige of eruption has disappeared, a relapse is certain. If even only temporary, still the gain is a great one, for we are now in a position to ensure any patient suffering from psoriasis a certain freedom from the eruption in the short space of a few weeks, and that too without the danger of inducing arsenical, phosphoric, or carbolic toxæmia; while the recurrence of the disease may be prevented by the exhibition of small, non-toxic, but long-continued doses of arsenic.

There are, however, certain disadvantages attending the use of chrysophanic acid (two of which were brought forward as arguments against its employment at a recent meeting of the Clinical Society of London), and which may now be briefly noticed—viz. (1st) its irritant action upon the skin; (2nd) the staining of the skin; and (3rd) the dyeing of the bedclothes.

The first objection has been already mentioned, and I fail to

see that it is more tenable in the case of chrysophanic acid than in that of any other medicinal irritant. In only one of the six cases narrated did any inflammatory trouble arise from the effects of the acid, and although I have employed it in a large number of cases of *Tinea circinata*, in no case has the acid occasioned any inflammation of the skin, and I feel satisfied that, unless in very exceptional cases, the occurrence of any undue degree of dermatitis can be readily averted by commencing with a weak ointment as already suggested.

The second drawback—the staining of the skin—is not so easily disposed of, for no method of extracting the dye from the epidermis has yet been devised; but I have not found even in private practice that this was regarded by the patients as a serious objection, for, as the curative effects of the agent were so manifest, the one point more than counterbalanced the other. The shedding of the epidermis, when assisted by warm baths, is not a protracted process, and at its conclusion the skin will be found to be purer in colour than before the commencement of treatment.

The third objection — the discoloration of any article of clothing with which the acid comes in contact—must fall to the ground, now that we know how to remove the stains; but when first employing Goa powder, from which chrysophanic acid is derived, and which is equally powerful as a dye, this objection seemed to me to be a somewhat serious one, for the matron of the infirmary complained to me that not only were the bedclothes belonging to the bed in which the patient slept deeply stained of a purple colour, but that nearly all the bedclothes in the ward were in a similar condition. On inquiry I discovered that this arose from the fact that the patient—a young lad suffering from favus—had a strange proclivity for standing on his head on the beds of the other patients. It is needless to say that his acrobatic peformances were very soon put a stop to, and since that time we have always employed the same bedclothing for each fresh case, the articles being rendered practically, though perhaps not esthetically, pure before the reception of the new occupant. The necessity for such conservative measures does not now exist, for Mr. Balmanno Squire has recently informed me that by the careful use of bleaching

powder the stains can be readily got rid of, and thus the third objection has been satisfactorily overcome.

In bringing my remarks to a conclusion I would say that, from a not inconsiderable experience of the various modes hitherto employed for the treatment of psoriasis, I feel justified in asserting that by no other method can such certain and speedy results be attained as by chrysophanic acid; and as I accept without reserve Mr. Balmanno Squire's statement, that "the efficacy of chrysophanic acid in psoriasis is certainly one of the most astonishing facts in modern therapeutics," I cannot but think that this ready method of treating a notoriously intractable disease must ere long receive he approval of all unprejudiced observers.

ARE THERE LAWS OF THERAPEUTICS?

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It has been shown in a previous article that the double action of medicines was distinctly enunciated by Cullen, more especially in his Materia Medica: and it was while Samuel Hahnemann was engaged in translating this work into German that the conception first suggested itself to his mind. The explanation which Hahnemann gave of the primary and secondary actions of drugs was the same as Cullen's theory of sedatives, only that he inverted the part of the effect which was to be attributed respectively to the medicine and to the reaction or the *vis medicatrix naturæ*. Cullen maintained that the stimulant action was the result of the *vis medicatrix naturæ*, and the subsequent sedative action the direct effect of the drug.

Hahnemann's explanation must be given in his own words:— "Every agent," he says, "that acts upon the human economy, every medicine produces, more or less, some notable change in the existing state of the vital powers, or creates a certain modification in the health of man, for a period of shorter or longer duration: this change is called the *primitive effect*. Although this is the joint effect of both a medicinal and a vital power, it belongs, notwithstanding, more particularly to the former, whose action is exercised upon the body. But our vital powers tend always to oppose their energy to this influence or impression. The effect that results from this, and which belongs to our conservative vital powers and their automatic force, bears the name of *secondary effect* or *reaction*."[1] Any one acquainted

[1] Hahnemann's *Organon*, p. 128. Translated by Hering. New York: 1860.

with Cullen's writings will have no difficulty in recognising the paternity of this explanation.

I cannot forbear quoting another very important passage from the "Organon," which really gives the key to Hahnemann's entire system of medicine. "In the descriptions," he says, "which have been handed down to us by the early writers of the frequent dangerous consequences resulting from the administration of medicine in large doses, symptoms have also been remarked that did not show themselves at the beginning of these sad events, but merely towards the conclusion, and which were perfectly opposite to those at the commencement. These symptoms, contrary to the *primitive effect* or to the so-called action of medicines on the body, are owing to the reaction of the vital force of the organism. They constitute the *secondary* and *consecutive effect*, whose traces are seldom perceived when moderate doses, by way of trial, are employed." [1] There is nothing original in all this, but at the same time it is idle to deny that Hahnemann had the most distinct and clear conception of the double action of medicines.

After this clear recognition of the opposite symptoms produced during the primary and secondary actions of large doses of drugs, it seemed likely that Hahnemann would conclude that a medicine whose secondary action caused symptoms in the healthy similar to the symptoms of a natural disease might be administered for the cure of the latter in doses sufficiently small only to produce the primary action; or that, if the symptoms of the primary action of a drug in the healthy were similar to the symptoms of the early stage of a natural disease, that this medicine might be given for the cure of the second stage of the latter: and that thus there was no real difference between the homœopathic and antipathic methods of cure. This, however, was not the conclusion at which Hahnemann had arrived. "The more nearly the symptoms excited by the direct action of a medicine," says Hahnemann, "correspond with the symptoms of the disease to be cured, the more certain will be the good effects of its administration." [2] And he instructs his disciples only to use small doses of drugs in proving medicines on the

[1] Hahnemann's *Organon*, p. 154.

[2] Hufeland's *Journal der Praktischen Heilkunde*. S. 438.

healthy in order that the primary may not be mixed with the secondary action of the drug. When, however, a drug is administered even in small doses to a healthy individual for a sufficiently long time to produce a disease, the most marked symptoms really belong to the secondary and not to the primary action of the drug; so that the practical outcome of Hahnemann's system need not necessarily have differed from what it would have been had he recognised that the law of contraries and similars are only different expressions for one fundamental truth. Had he contented himself with the generalisation comprised in the formula of *similia similibus curantur*, and with the precepts necessary to carry this formula into practice, his system would not have differed from one which might have been constructed on the basis of the principle of *contraria contrariis curantur*. But Hahnemann did not content himself with founding his system on the generalisation of similars. He endeavoured to explain how the "artificial disease by reason of its similitude and greater intensity," now substitutes itself for the "natural disease;"[1] and to prop up this theory he was driven to have recourse to the figment of a purely "dynamic immaterial power," a principle which afterwards led him to advance the theory of the dynamisation of medicines by succussion, and to a variety of other equally wild and foolish speculations.

My opinion of Hahnemann's system of medicine was given in this journal[2] several years ago, and I have never seen reason to modify the judgment which I then expressed. At the same time no one who is competent to form an opinion can deny that one or two of the principles lying at the foundation of this system are substantially true. These principles are what may be briefly termed the local action of medicines or the elective affinities of the tissues, the double action of medicines, and the opposite effects of large and small doses. When I was a medical student I became thoroughly imbued with the idea that inflammation comprised two stages, the first of which consisted of excess and the second of deficiency of nutrition activity. I also had an idea, which I afterwards recognised to be similar

[1] *Organon*, p. 167.

[2] *The Practitioner*, May, 1873, p. 257, "The Geometrical Method in Medicine," Part III.

to Broussais' conception of disease, namely, that every disease, even the specific fevers, were in their origin local, and consisted of inflammation or irritation. The local action of drugs, and their primary and secondary effects, followed as corollaries from these leading conceptions.

Starting from these principles, I formulated the following precept, which I frequently enunciated to my fellow-students :— "When a drug is known to produce inflammation of a certain organ or tissue in a healthy person it may be used in the cure of the second stage of inflammation of the same organ or tissue." I even went the length of consulting the works on poisons to which I had access, in order to find out which were the respective organs these agents affected; and it was only two or three years afterwards that I found out that I was then working on the same lines as Hahnemann.

As my medical studies advanced I discovered, that although this mode of viewing the facts was not false, yet it was extremely narrow and contracted, and that, although it might lead to some practical results, it was quite insufficient to form the basis of a system of medicine. The endeavour to reduce complicated phenomena to one principle is indeed a phase of thought which is alike common to the infancy of a science and to the immaturity of the human mind. I admit, therefore, that however narrow and even absurd may have been the system erected on these principles by Hahnemann, that the principles themselves are empirical expressions for undeniable facts.

I shall now offer a few remarks on the moral aspects of the present attitude of the profession towards homœopathists. In the whole controversy which has led up to the present state of matters, the question of the ethics of medical intercourse has been inextricably blended with the question of the truth or falsity of the homœopathic dogmas. On the one side as well as on the other, what ought to have been a question of liberty, was argued as if it were one of truth. There can be nothing clearer in history than that the policy which the profession adopted towards homœopathists was copied from the Church. It was throughout an ecclesiastical policy, the ecclesiastical terms of orthodoxy, heterodoxy, and apostacy being constantly employed in the

controversy; and excommunication from professional privileges being regarded as the natural punishment for holding heterodox opinions. In a leading article in the *Lancet*, March 28, 1846, the editor begs to direct the attention of his readers "to the kind of *orthodoxy* sustained by the Court Medical Staff;" and after classing such men as Sir B. Brodie, Sir James Clark, and Dr. Bright, along with homœopathists, he states "that the true labour of young physic is to introduce an *orthodox spirit* in the place of the prevalent *lapsarianism* of the day." One would think that we are perusing the columns of the *Church Times* or some other equally irreproachable Church organ. In the *Lancet* of May 14, 1846, Dr. Madden, a homœopathist, is compared to Mr. Paley, a resident tutor of St. John's College, Cambridge, who had just been expelled from the College and the University for having published heterodox opinions, the editor asking: "Is not the conduct of the University of Cambridge a good example to the University of Edinburgh?" The policy of the Church is thoroughly consistent, she claims to possess an inspired record, and to be the custodian of divine and absolute truth; and banishment from membership is a natural result of rejection of this truth; but we only possess relative truths, we have no inspired record, and no one has a right to set himself up as an infallible judge of what constitutes truth; hence to exclude a man from professional privileges for the sake of his opinions is as illogical as it is impolitic. I am finding no fault with the *Lancet* of those days. It must be estimated according to the spirit of the time in which it was written, and when judged by this standard it will be found that the homœopathists had no clearer conception of the laws of liberty than their opponents. The followers of Hahnemann maintained that they were in possession of the true faith which would entirely supersede the antiquated rubbish practised by their opponents, and it is upon the truth of their doctrine that they founded their claims to professional recognition. In the first volume of the *British Journal of Homœopathy* the editors remark in the introduction, "Our paper will be open for the expression of every shade of opinion, *provided that the principle of 'similia similibus curantur' be fully admitted by the writers.*"[1]

[1] *The Journal of Homœopathy*, vol. i.

And in the opening address at the first meeting of the homœopathic congress given by Dr. Black, he says: "This congress must ever be purely catholic, *a meeting in which every follower of Hahnemann has a common right.*"[1] I have before me just now a copy of the Laws and Regulations of the British Homœopathic Society, instituted in 1844. This copy was printed in 1868, and I believe that these laws are in force at the present time. The first law states that the society "has for its objects the advancement and extension of the principles of Homœopathy," and the fifth requires ordinary members to be registered practitioners, "*who shall have treated their patients homœopathically for at least three years.*" Another grade of members called "Inceptive" is divided into two classes, (1) registered practitioners, and (2) medical students; and the former of them is to consist of those "who *believe* in the doctrines of Hahnemann, but have not practised homœopathically for three years." The Inceptive members are in short admitted on probation; and when they are fully initiated into the mysteries of the art they will be admitted to the full privileges of the sacred order. This may be catholic in the Ultramontane sense of the term; but to unprejudiced minds it savours too much of exclusiveness and intolerance to be considered catholic in a large-minded and liberal sense.

But the homœopathists may say that the sectarian position which they assumed was forced upon them by the intolerance of their opponents, who refused to admit homœopathic communications in the leading medical journals, and prevented papers on homœopathic subjects from being read and discussed at the medical societies. But supposing all this to be true, —and a great deal of it is true,—there was no occasion for the homœopathists to have accepted a sectarian position; and indeed, had they been the catholic-minded men that they represented themselves to be, they would not have accepted it. If the privileges of the ordinary societies and journals were denied them, it is clear that they were justified in establishing societies and journals of their own. They ought, however, to have called their society "The Therapeutical Society," or some such name, and to have made it clear in their code of laws

[1] *The Journal of Homœopathy*, vol. viii. p. 535.

that any registered practitioner of known respectability would be welcomed as a member provided he wished to cultivate the science and art of the treatment of disease in any way which seemed to him best.

And in establishing their journal they ought to have seen that their real grievance against their opponents was a moral and not an intellectual one. The fault which their opponents committed was not that they did not accept the peculiar views of the homœopathists, but that they made an organised attempt to suppress their discussion. In establishing a new journal, therefore, the homœopathists ought to have given it a title which would be a standing protest against the violation of the laws of freedom on the part of their opponents. They ought to have called their journal "The Free Lancet," or some such name—a name which would have implied that the existing *Lancet* had become intolerant, exclusive, and sectarian. But instead of that they put the intellectual differences between themselves and their opponents in the foreground, and called their journal by a name distinctive of their peculiar doctrines. It may be thought that the selection of a name for a journal is an exceeding small matter, but it led to issues which were exceedingly great. A biologist can exhibit two bits of protoplasm, and scarcely any difference can be detected between them; and yet the one may under suitable circumstances develop into a God-like man and the other only into a croaking frog. The initial differences are small, but the terminal differences are vast. Had the homœopathists called their journal "The Free Lancet," and loyally pursued the policy which this name implies, they might have expected contributions from men like Sir B. Brodie, Sir James Clark, and Sir John Forbes, not because these men had much sympathy with their opinions, but because they were lovers of freedom, and the flag of freedom has never been unfurled without gathering around it the choicest spirits of an age. But by adopting the title of *British Homœopathic Review*, and following out most rigidly the policy which this title implies, they put upon their journal and upon themselves the stamp and seal of sectarianism; and while the profession as a whole has been developing along with the age and becoming broader and more catholic-minded, the homœopathists are in the present day

almost as narrow-minded and sectarian as on the day when their first journal was issued. It is not those who demand of practitioners a three years' novitiate, and subscription to a stringent creed before admission to the privileges of ordinary members of their society, and who require from all contributors to their journals a confession of faith in the dogma of *similia similibus curantur*—I say it is not those who have a right to preach to us the lofty doctrines of toleration and of liberty. The homœopathists do not bring a single indictment against the profession which cannot be replied to by a *tu quoque* argument.

And now having replied to the homœopathists, and having shown that they have no right to complain of our conduct until they rectify their own position, we, as a great and learned profession, are left face to face with the "eternal verities." Does public opinion acquit us of all intolerance towards homœopathists? What will be the verdict of the historian of the future of the conduct of the profession as a whole in this controversy? And above all, do our own consciences absolve us of violating the laws of liberty? These are questions which we ought to face fairly and to answer dispassionately. And let us first notice the delicate question of medical consultation. Any medical man in the assertion of his own individuality has a right to decline to meet any other medical man if he form an unfavourable opinion of him. There is scarcely any limit to the rights of the individual in such matters, except the limits which are dictated by prudence. And if ever it was right to refuse to meet any one in consultation, it was right to refuse to meet Hahnemann. He was the very genius of intolerance; and no one who differed from him in the slightest degree could possibly consult with him and maintain his self-respect. In order to hold a satisfactory consultation, the right of one gentleman to form an opinion must be limited by the equal right of the other to form his own opinion; and before arriving at that consensus of opinion which indicates a successful issue to their mutual deliberations, there must be propositions the truth of which both gentlemen will recognise, and to which each can appeal. There are truths which the ordinary practitioner and a homœopathist will both admit; but they are frequently so remote from practice that large problems in philosophy and

science would require to be discussed before a consultation could be brought to a satisfactory conclusion. Life is too short, and the relief of suffering too urgent, for such a tedious process. But besides the difficulties as to consultation which arise when earnest men adopt different and opposite views of the fundamental principles of treatment, the homœopathists have erected artificial barriers where none need exist. Hahnemann wished to make the distinction between the old system and his own as clear and trenchant as possible, and with that view he adopted a new nomenclature, a new method of dispensing, new symbols for prescribing, new everything. If any homœopathist of the present day thinks that these innovations are improvements he is right in maintaining them; but what possible improvement can there be in rejecting the ordinary chemical nomenclature, and in calling carbonate of lime—calx and quinine—China? Such nomenclature can only be maintained as a badge to distinguish a sect, and if homœopathic practitioners do not wish to be treated as a sect, they ought to assimilate their mode of prescribing to the usual method so far as they can do so without losing sight of what they deem to be a real improvement, or sacrificing what they regard as a principle. Were they to do this it would be a guarantee of the genuineness of their desire for a real union of the profession. It was in this respect that I regarded Dr. Wyld's letter to Dr. Richardson as so peculiarly valuable. It was a model of conciliation in word and spirit; and while he declared that he still adhered to the fundamental principles of Hahnemann, he endeavoured to smooth over the non-essential differences. The difficulties therefore, in holding a satisfactory consultation with a homœopathic practitioner are necessarily great, and are rendered still greater by artificial obstacles; and there are many who can never under any circumstances bring themselves to meet a homœopath with any degree of satisfaction, and they are only exercising their individual rights in declining such a consultation. This is not prejudice, it is honesty, and it is only by the exercise of such rights by earnest men that medical consultation can be prevented from becoming a mere sham.

But the profession, not content to leave the question of medical consultation to individual judgment, unfortunately

took collective action. During the heat of the controversy, more than one of the examining boards of the kingdom refused to grant diplomas to students who were known to be infected with the homœopathic heresy. When a student goes up for examination he does not profess a *credo* but a *nosco;* the examination is not a subscription to a creed, but a test of knowledge; and if a man holding homœopathic views with regard to treatment exhibits a competent knowledge of the subjects of examination, and has in other respects conformed with the regulations, he has a moral right to a degree from any board of examiners in the kingdom. Some examiners, however, so far forgot the duties of their position as to test not merely the knowledge of the candidate, but his belief also. Candidates were asked whether they intended to practise homœopathy, and upon the answer depended the issue of the examination. The temptation to lie under such circumstances must have been peculiarly strong, and to the honour of some homœopathic practitioners be it told, they went through the ordeal without telling a lie, and suffered accordingly.

The full length to which opposition to homœopathy was carried in those days can hardly be credited by those who have entered the profession in recent years. "The anti-quackery feeling throughout the profession," says the *Lancet* in a leading article, "is proceeding at all points into energetic action. Elsewhere will be found a copy of the requisition to the Council of the Royal Medical Chirurgical Society, on the subject of homœopathic and other cognate quackeries. On Friday evening, the special general meeting of the Fellows of the Medical Society of London takes place, to adopt the necessary measures for the expulsion of homœopaths and their friends. On Thursday, a meeting of the Council of the College of Surgeons was held to consider what is to be done with the globulistic fellows and members. The subject having been thus taken up, we conceive there can only be one result; but of this the profession will in due time be made aware. The College of Physicians has joined in this movement. Before the recent examination, a homœopath applied by letter to the President for permission to present himself for examination before the President and Censors. The President very promptly and

properly refused to allow the quack to be examined; and at the last meeting of the Fellows the correspondence was read, to the evident satisfaction of the assembled body. These various circumstances show the soundness of professional feeling in every quarter, and among all classes of medical men. We congratulate the profession most sincerely upon the promising aspect of the anti-quackery movement at the present time."[1]

The great association which, from its power and influence, may be regarded as the parliament of the medical profession, also took "energetic action." At the meeting of the British Medical Association held in Brighton in 1851, resolutions of the most thoroughgoing and sweeping character, condemnatory of homœopathy and homœopathic practitioners, were passed. The fourth of these resolutions may be taken as a sample of the spirit which animated the rest. It stated, "that there are three classes of practitioners who ought not to be members of this Association; viz., 1st, real homœopathic practitioners; 2nd, those who practise homœopathy in combination with other systems of treatment; and 3rd, those who under various pretences meet in consultation, or hold professional intercourse with, those who practise homœopathy." This resolution was not so much an offence against the homœopathists, as it was against the liberties of the individual members of the Association, and the members in assenting to it surrendered to the society the right of judgment in a matter which ought to come within the province of individual responsibility. The policy which those resolutions stamped with the approval of the Association, even if they did not inaugurate it, has continued to this day to be the policy of the profession; although the rules which were the outcome of these resolutions, after remaining for upwards of twenty years as part of the bye-laws of the British Medical Association, were quietly omitted from the new bye-laws which it was found necessary to draw up in 1855, in consequence of the Association becoming incorporated under the Board of Trade. When we band ourselves into a society in which the members are bound not to meet homœopathic practitioners in consultation, we not only make it difficult for those gentlemen to discontinue their sectarianism; but we convert our Association

[1] *The Lancet*, October 11, 1851.

into a trades' union with coercive laws, laws which no society whatever is justified in exercising over its individual members. We ought to show the world that we are a great and enlightened profession, and that we do not stoop to the paltry and immoral expedients of a trades' union in order to maintain our dignity and emoluments.

Our present position will be rectified when it is understood that no man is to be excluded from our medical societies, and from professional intercourse generally, simply for the sake of his opinions; and this will place the question of medical consultation on the basis of individual judgment, a basis from which it ought never to have been removed. Homœopathy would even then meet with a considerable amount of opposition; but the softening influences of time have already done a great deal, and would soon do more, in bringing us nearer each other and making professional intercourse possible and mutually helpful. If every man were left to please himself, the present state of matters would work its own cure. One man would find that he could consult with homœopathic practitioners satisfactorily; another would find that he could not; and a third would find that he could meet some and not others; and so on, until they would gradually amalgamate with the general body of practitioners, and all trace of them as a separate sect be lost.

ON THE USE OF OIL OF TURPENTINE AND LUCCA OIL IN TYPHOID FEVER.

BY P. L. O'NEILE,
Physician to the Fever Hospital, Athy.

In the April number of the *Practitioner* there appears an extract from a communication of Doctor Perssé White to the *Medical Times and Gazette*, in which he extols oil of turpentine as a remedy in bronchitis complicating typhoid fever. I can endorse his remarks, and at the same time add that oil of turpentine combined with lucca oil, in the proportion of fifteen minims of the former to thirty or more of the latter for a dose, and made up with mucilage or the yolk of an egg, is the best remedy for the diarrhœa and tympanites which are generally associated with the typhoid which prevails here at present. In the extensive practice which I enjoy, I have found this combination superior to any other drugs. Under its influence the stools are reduced in number, and become more solid in consistence, and the tympanites gradually less. In only a few patients have I known its administration to be attended with disagreeable results to the stomach, the greater number manifesting a wonderful tolerance of it. It may be given three or four times in twenty-four hours, and continued for weeks if necessary. It prevents the palpable wasting of the disease, and obviates the necessity of giving alcoholic stimulants to a great extent—no mean desideratum in a workhouse institution.

Reviews.

A Text Book of Physiology. Second Edition. By Dr. M. Foster, F.R.S. London: Macmillan and Co. 1878.

The first edition of the *Text Book of Physiology*, by Professor Michael Foster, was noticed in the *Practitioner* for June 1877, and the quick appearance of a second leaves but little to add to the remarks we have made. Professor Foster's work was then recognised as the best example of the best school of physiological work in England, and the demand for the book has shown how much the need of it was felt.

With regard to the present edition, the general plan of the work has hardly been altered, but nearly a hundred pages of new matter have been added; these additions are mainly expansions of the pre-existing paragraphs in small print, so that the student who has before studied and learnt the older book, will easily recognise the points on which fuller detail has been considered necessary. Among the principal additions we notice a very careful account of the recent researches on the localization of the Functions of the cerebral Areas, by Ferrier, Hitzig, Burdon Sanderson, &c.; a more detailed account of the nervous government of the lymph hearts in the frog; and a full statement of the present state of our knowledge of the "Visual Purple," about which so much has recently been written, and the physiological bearing of which is still so obscure.

Another noteworthy, and we think very welcome addition, is the insertion of woodcuts of many of the instruments used in physiological research.

In England, unfortunately, the number of properly furnished physiological laboratories may almost be counted on the fingers of one hand, and while this is the case it is better that students should have even the very imperfect notions of the tools of a physiological workshop which engravings can give them, than that they should be left to evolve them out of their own inner consciousness by the aid of a word description.

Outlines of Physiology. By Dr. McKendrick. Glasgow: James Maclure. 1878.

Dr. McKendrick's book is one which he has evidently written to supply a want felt by himself in common with all teachers of

a somewhat indefinite subject, such as physiology, a want, that is, of time to explain fully in a limited number of lectures both the principles and the details of the science he is teaching.

It may, however, be questioned whether it is advisable to try to put into a physiological text-book the first principles of all the allied sciences; and it adds not a little to the bulk of, and difficulty of reading, Dr. McKendrick's work, to find, for example, a smattering of ethnology, a full account of the chemistry of the fatty acids, or a discussion on the laws of the constancy of energy, among matter purely physiological.

But though we think the author has erred somewhat in treating a rather extensive range of subjects, it must be acknowledged that he has put together also quite a wonderful amount of physiological information, while his manner of writing is that of one who knows well how to teach. The style is clear, the illustrations are numerous, and for the most part original, and the writer is not afraid of recapitulation.

Another good point about the book we notice is the addition of a short bibliography to the more important chapters, which will prove very useful to students who are desirous of extending their reading.

Dr. McKendrick's work is one which cannot fail to be very useful, first, to students who will be content with the general knowledge of physiology they gain from it, and secondly, to those who on reading it will be tempted by the author's evident love for, and mastery of, his subject, to study it more deeply and thoroughly for themselves.

Epitome of Skin Diseases, with Formulæ. By TILBURY FOX, M.D., F.R.C.P.; and T. C. FOX, B.A. (Cantab.), M.R.C.S. London: Renshaw.

THIS small book gives in very brief compass the opinions as to the nature and treatment of skin diseases expounded at length by Dr. Tilbury Fox in his larger volume. The authors intend it to be useful to students who are preparing for their examinations, and to medical men for reference in their daily practice.

A Practical Treatise on Diseases of the Skin. By LOUIS A. DUHRING, M.D. Philadelphia: Lippincott and Co. 1877.

DR. DUHRING modestly states that he makes no pretensions to exhaustiveness in his admirable book, his object being to write a concise, practical, and useful treatise. The work, however, is as complete as can well be desired.

The diagnosis and treatment of skin diseases are given fully and clearly, and if the pathology is treated with greater brevity than might be expected in a volume like the one before us, we

are on the other hand spared disquisitions on obscure points of the morbid anatomy of the skin about which observers are not agreed.

Dr. Duhring is a pupil of Professor Hebra, to whom he has dedicated the book. The influence of his master's teaching is perceptible in nearly all the chapters, and in none more so than in the admirable one on eczema. We call attention especially to the sensible rules laid down for the treatment of this distressing and often obstinate affection. There is no disease in which the patient is more likely to be made the victim of routine treatment by drugs, and it would be well if practitioners were to bear in mind Dr. Duhring's caution that constitutional remedies in eczema, though of decided benefit in the great majority of cases, are not demanded in every case, and unless indicated, are not to be recommended. Constipation is not to be permitted to exist, and diuretics are to be given when there is deficient secretion of urine.

In acute eczema a plan suggested by Dr. White of Boston is commended. "The affected part is to be bathed with black-wash, applied by means of a sponge or a piece of cloth, for fifteen minutes at a time, and at intervals of a few hours or longer; the sediment should be permitted to remain on the skin. After the application, a small quantity of oxide of zinc ointment is to be rubbed gently over the part. As a rule, the itching and burning are greatly relieved at once, and the disease is very often arrested in its course."

We cordially recommend the book as being specially adapted to assist the practitioner in the exigencies of practice.

Brain: a Journal of Neurology. Edited by J. C. Bucknill, M.D., F.R.C.P., F.R.S.; J. Crichton Browne, M.D., F.R.S.E.; D. Ferrier, M.D., F.R.C.P., F.R.S.; and J. Hughlings-Jackson, M.D., F.R.C.P. London: Macmillan & Co.

A chain is no stronger than its weakest link, and it is at that point that it will break if strained evenly beyond its strength. But in a complex machine the strain is not equal; it is not always the part which is absolutely weakest, but that where the strain is greatest which gives way first. The human body is no exception to this rule, and so we find the heart failing in the coal-heaver, the kidneys in the beer-drinking plumber, and the brain in the merchant, lawyer, doctor, or literary man. The hurry and struggles of modern life have no doubt increased the amount of nervous disease in this country, while increasing knowledge of the functions of the nervous system and fuller recognition of the important part

played by it in almost every ailment to which the human body is liable, is investing the study of this subject with an importance which it has not hitherto possessed. The brain is now generally acknowledged to be the organ by means of which mental operations are carried on, but the functions of its various parts, the relation of these to circulation and digestion, the significance of functional disturbances, and the action of drugs upon it, are still very imperfectly known to the bulk of the profession. The papers in which the most recent work on this subject is contained are to be found in scientific journals rarely accessible to men living in the country, and only occasionally seen by those whose residence in town allows them now and again to visit a public library. Most practitioners have thus been obliged, however unwillingly, to remain in ignorance of many recent discoveries regarding the functions of the nervous system, and have been deprived of the assistance that these might have afforded in practice by the impossibility of obtaining the knowledge they require. The present journal seems to supply this want. One paper, by Bevan Lewis, on the structure of the cortex cerebri, shows how certain groups of ganglionic cells characterise the structure of the motor parts of the brain; in another, G. H. Lewes discusses the connection between motor feelings and the muscular sense; and in a third, on Brain Forcing, Dr. Clifford Allbutt pictures most vividly the evil results of early overwork, throws out most interesting suggestions regarding the qualities which lead to success in life, and gives most useful advice regarding education. The connection between nervous lesions and the symptoms they produce is taken up in papers—by Mr. Jonathan Hutchinson on the symptom-significance of different states of the pupil; by Dr. Duret on the *rôle* of the duramater and its nerves in cerebral traumatism; by Dr. Gowers on some symptoms of organic brain disease; and by Dr. Bennett on hysterical symptoms from cerebral tumour. The treatment of cerebral disease by means of mustard baths is illustrated by some cases of Dr. Urquhart, and a paper by Dr. Buzzard on lead-poisoning shows that although a great part of the journal is devoted to brain, the editors are not unmindful of the second part of their title, and by giving information regarding other parts of the nervous system justify the title of a journal of neurology. There are besides reviews of works on neurology and abstracts from papers in British and foreign journals. The plan of the journal is therefore very complete, the character of the papers exceedingly high, and we believe that to many a medical man it will not only supply a felt want, but will afford pleasant reading and many suggestions both for speculative thought and clinical practice.

Clinic of the Month.

Semmola on the Treatment of Nervous Vomiting by Electricity.—In a letter to Dr. P. Schisardi, published in the *Gazetta Medica Italiana-Lombarda*, No. 6, 1878, Dr. Semmola gives the results of observations made during several years, on the diagnosis and treatment of nervous vomiting. He finds that electricity in the form of the constant current is the most effective remedy. Soon after the first application the patients can retain food, although for many weeks previously they had always rejected it. He believes also that the constant current is not only a sure remedy, but also a valuable means of diagnosis in all cases of chronic vomiting. If the elements of diagnosis be not sufficient to determine whether the vomiting is dependent on some morbid process in the stomach itself, or on reflex action (as from worms or chronic uterine disease), the application of the current at once settles the question. In cases where the vomiting is not exclusively and primarily nervous, its application fails in enabling the stomach to tolerate food.

Dr. Semmola relates twenty cases in which a cure was produced by the means which he recommended. The last of them is as follows:—

The daughter of Mr. C., a member of the Italian parliament, had been greatly reduced by vomiting, which had lasted three months, and which was attributed by her medical attendants to perforating ulcer of the stomach. On the evening of November 14, 1875, she had a sudden attack of aphonia, and was believed to be at the point of death. Dr. Semmola was consulted for the first time. The aphonia led him to suspect hysteria. He was unable to see any vomited matter, as she had taken no food since the morning. He applied the current by means of Onimus' apparatus, and very soon afterwards the patient was able to take a cup of milk. On being questioned she acknowledged that she had a sensation of constriction in the throat; and this confirmed his opinion that he had to deal with a case of hysterical neurosis. The constant current was applied

between the sides of the neck and the larynx, and afterwards between the sides of the neck and the stomach. The application was repeated several times daily; and in two months the cure was complete and permanent. (*The London Med. Record*, April 15, 1878.)

Period of Incubation of Mumps.—Mr. A. R. Manby of East Rudham, Norfolk, states that the period of incubation in mumps is passed over in silence in many modern works, and that on being asked how long a lady who had been thrown in the way of mumps three days previously need fear lest she had contracted the disease, he replied at hazard a fortnight, but was annoyed to find that an attack supervened on the twenty-first day. (*British Med. Journal*, May 4, 1878.)

Diphtheria and Lactic Acid Spray.—Dr. H. Beyer, of Long Island City, reports two cases of severe diphtheria, successfully treated by the local application of dilute lactic acid in the form of spray. He recommends the adoption of this remedy in all desperate cases of this disease. (*Idem.*)

The Alkaloids of Opium. — The recognised opium-alkaloids are sixteen in number. The effect of each differs from the rest or from that of opium itself. Dr. Isaac Ott reports a large number of experiments, which, taken in conjunction with previous knowledge, lead him to conclusions summarised thus :—1. Cryptopia is narcotic; it excites and then depresses reflex action by an effect on the spinal cord, reduces the power of the motor nerves, abolishes sensation by an action on the spinal sensory ganglia and lowers the heart-beat by its action on the muscular structure. 2. Thebaine is a spinal convulsivant; it has no action on the motor or sensory nerves, or on striated muscle. It reduces the heart-beat by an action on that organ, and increases blood-pressure by stimulating the cerebral vaso-motor centres. 3. Codeia is a narcotic and spinal convulsivant; it produces a veratroid contraction of striated muscle and depresses the heart-beat by an action on the cardiac muscle. 4. Chlorocodide is a tetanic agent. 5. Apocodeia produces vomiting, coma, and death. 6. Narceine is soporific to cold-blooded animals, but not to man, and is a spinal convulsivant. It does not destroy the motor nerves, as they act on thrusting a probe down the spine. It produces veratroid contraction of the muscle and reduces the heart-beat by stimulation of the peripheral end of the pneumogastric. 7. Papaverine is narcotic and convulsivant; the convulsions being partly spinal and partly peripheral, the latter, it is highly probable, from an action on the muscle. It diminishes the heart's contractions by

its peripheral action on the cardio-inhibitory apparatus. It also causes veratroid contraction of the muscle. 8. Narcotine is non-narcotic and a spinal convulsivant; it produces veratroid contraction of striated muscle and is a very active agent to decrease the beats of the heart by an action on the cardiac muscle. 9. Cotarnine is soporific and paralyses, like curare, the motor nerves. 10. Hydrocotarnine is narcotic and convulsivant. 11. Hydrochlorate of cotarnamic acid is a convulsivant, and paralyses the pneumogastric. 12. Laudanosine and laudanine are tetanic agents. 13. Morphia is a narcotic and spinal convulsivant. It produces veratroid contraction of muscle and reduces the heart-beat. 14. Oxymorphia has an action like morphia, only weaker. 15. Apomorphia is an emetic, it excites and reduces spinal reflex excitability, and diminishes the number of cardiac contractions. 16. Meconine is narcotic to cold-blooded animals, but not in doses of two grains by the stomach in man. It causes hyperæsthesia and paralysis of voluntary motion with general relaxation. It also produces a veratroid contraction. The opium-alkaloids all have a dominant action on the nervous system, causing first, increased exaggerated functions, and, if the dose be large enough, a paralysis of them. In the warm-blooded animals this action is both on the spinal cord and on the cerebrum. (*British Med. Journal*, May 4, 1878.)

Compressed Oxygen as a Test of Cellular Potency.—Professor Paul Bert, of Paris, has lately utilised a former discovery of his, that compressed oxygen destroys organised cellular ferments, as well as living cells in general; whereas it has no effect on chemical (liquid) ferments, to determine whether certain poisonous animal ferments owe their properties to the presence of cells or not. He found that the poison of the scorpion, fresh, dried, or redissolved in water, resisted the action of compressed oxygen, and that vaccine lymph could be exposed for a week to oxygen at a pressure of fifty atmospheres without losing its peculiar influence. In the same way the virus of glanders and that of malignant pustule remain unaffected. Hence, Bert concludes that all these poisons are independent of living cells; and that even if the corpuscular elements which their liquids contain appear, as Chauveau maintains, to be the seat of the fermentative material, this is only because the latter adheres to them by simple attraction, just as, for example, hæmoglobin is retained by the blood-corpuscles. (*Med. Times and Gazette*, November 3, 1877.)

Artificial Anæmia as a Mode of Treatment for Diseases of the Limbs.—A new application is suggested for Esmarch's elastic bandage, namely, as an anæsthetic and

curative agent in painful inflammatory affections of the extremities. Dr. Bernhard Cohn, of Steglitz, relates two cases in which the induction of artificial anæmia by the bandage was followed by great relief; a case of phlegmonous inflammation of the foot in a man of sixty-three, and one of simple œdematous inflammation of the fore-arm in a maid-servant; and he gives the details of a third case in which a practical cure resulted from Esmarch's method, after all other modes of treatment had been exhausted. The patient, a boy of three and a half years, had white swelling of the left knee-joint, of eighteen months' standing, with considerable enlargement of the condyles of the femur, and thickening of the tissues around the patella and the head of the tibia. There was great sensitiveness of the parts to pressure, movement was impaired, and walking only possible for a step or two, with lowered pelvis, and with the tips of the toes alone reaching the ground on the left side. After a few weeks' daily application of the bandage for fifteen to sixty minutes, the improvement was so great that the limb could be moved in all directions or handled without pain, the entire sole of the left foot could be brought to the ground in walking, and the gait was even on the two sides. In fact, all that was left of the former affection was a little swelling and limitation in the movement of the joint. Dr. Cohn, in his remarks on the cases, declares, that in practice the idea that the increase of blood in the capillaries which follows the removal of the bandage will entirely undo the effect of the previous anæmia is not sustained. He considers that the bandage acts mainly by relieving the congestion of the inflamed part, and perhaps by improving the conditions of diffusion between the tissues and the blood-vessels. He recommends an elastic band one inch and a half wide, encircling the limb so that each turn overlaps the one below, and finished off with five to eight turns completely covering each other. He thinks that the bandage may be allowed to remain on the limb longer than we might, *à priori*, think justifiable, and that there is less danger of gangrene if both arteries and veins are completely compressed than if the compression be imperfect so as to close the veins and hinder the escape of blood, while it is still allowed to enter by the arteries. In the latter case œdema, with enormous rise in the blood-pressure, must be the result. To avoid pain as much as possible, the final turns must not be tighter than absolutely necessary to stop the circulation. The questions, "How often can and ought the constriction to be renewed?" and "Is it better to use single long compressions or frequent short ones?" require, he thinks, further experience to answer them satisfactorily. (*Med. Times and Gazette*, Dec. 1, 1877.)

The Contagium of Measles.—At the meeting of the Pathological Society on the 7th May, Dr. Braidwood, of Birkenhead, showed specimens and drawings illustrating the microscopical characters of the tissues in measles. He commenced by stating that the research was part of the investigation upon the life-history of contagium being carried out by himself and Mr. Vacher. He showed a specimen of some bacterial-looking bodies which had been collected from the breath of a child affected with measles, and, as will be seen, he had found similar bodies in the skin of measles subjects. Two cases only had been yet observed. In each the post-mortem examination was made within twenty-four hours of death, the tissues preserved in strong alcohol and sent to Cole and Sons for preparation. In the first case death occurred on the eighth day after commencement of eruption; swelling of corium and rete mucosum from small-celled growth, especially around the hair-follicles and sweat ducts, and in the true skin, groups of spherical and rod-shaped sparkling bodies not stained with carmine. They did not occur in the sweat-ducts or hair-follicles, and were not met with deeper than the sudoriparous glands. The lungs showed plugging of air-vesicles by exudation material, altered blood-globules, and also many of the sparkling spherical bodies similar to those met with in the skin. Like bodies were also met with in the liver around the bile-ducts. In the second case death occurred on the fourteenth day after the commencement of the eruption. There was less swelling of the skin, but still similar particles occurred in the urine and in the lungs as in the other case. From the similarity of these bodies to the organisms in vaccine virus, Dr. Braidwood thought that they represented the measles-micrococcus, and it was interesting that similar bodies should be found in the breath of measles subjects. (*Lancet*, May 18, 1878.)

Chaulmoogra Oil (Oleum Gynocardiæ). — Chaulmoogra oil is a remedy which has been employed for centuries by the natives of India in the cure of leprosy and other forms of skin disease. It is a fixed oil procured by expression from the seeds of the *Gynocardia odorata*, which are now officinal in the Indian Pharmacopœia (*Gynocardiæ semina*). Mr. R. C. Lepage, late of Calcutta, has collected in pamphlet form all that is known regarding both the plant and the oil. The use of the latter was first brought under the notice of the profession in 1854 by Dr. Mouat, of the Bengal Medical Service, who had employed it with considerable success in a few cases of leprosy, scrofula, and constitutional syphilis. But though others have found the remedy of service in these and allied affections, its more general

employment has been retarded by the persistent adulteration of the oil by the natives of India. Dr. Dymock of Bombay, however, has recently discovered means for detecting its adulteration, so that it is believed it can now be procured in a state of purity, and it is expected that the remedy will be found of real service in the above-mentioned diseases, and others of a similar nature. The dose of the oil, which is somewhat unpleasant in flavour and smell, is from five to six drops gradually increased. It is best given after meals, and may be taken in milk, glycerine, or cod-liver oil. The seeds, coarsely powdered, may be given in the form of pills of five or six grains. In skin diseases the oil should also be applied externally, or the Unguentum Gynocardiæ (I. P.), which is prepared by beating the seeds to a paste along with simple ointment. (*Medical Times and Gazette*, April 6, 1878.)

The Koroniko Plant.—Mr. John Arthur Francis, of Southsea, writes that on seeing a paragraph in the *Evening Standard* of May 10th referring to the koroniko plant of New Zealand, erroneously spelt roromiko, as a newly discovered remedy for diarrhœa, he can fully endorse the statement as to its efficacy as an astringent. He has often used it in an up-country district in Hawkes' Bay, New Zealand, during the last four years, and has found it even more certain in its effects than the ordinary astringent mixtures. It is an old and well-known remedy amongst the Maories and up-country shepherds, especially for intestinal disturbances arising from drinking stagnant swamp water in dry seasons. The usual method of using it is by making a strong infusion of the young leaves. The koroniko is a species of broom; and Mr. Francis has no doubt that it would make a valuable addition to our Pharmacopœia. (*British Med. Journal*, May 25, 1878.)

Extracts from British and Foreign Journals.

The Treatment of Diphtheria.—Dr. C. E. Billington, physician to the Demilt dispensary, gives the following method of treating diphtheria.

I. He gives a teaspoonful of a mixture of iron and glycerine containing:—

Tinct. ferri chloridi	fl. ʒi.—ʒiss.
Glycerini.	
Aquæ	āā fl. ℥i.

And also of a mixture of chlorate of potash containing:—

Potassæ chloratis	ʒss.—ʒi.
Glycerini	fl. ℥ss.
Aquæ calcis	fl. ℥ij. ss.

employing usually the weaker strength indicated, of both mixtures, every half-hour, except at night, when the patient may be allowed to sleep for an hour or two at a time.

II. He sprays the throat with

Acidi carbolici	♏. xv.
Aquæ calcis	fl. ℥vi.

for several minutes at a time whenever the above mixtures are given—that is, every half-hour. It is essential that the nurse be carefully instructed in the proper method of doing this. The mouth must be opened widely. When the child is too young to do this, the spraying must be omitted.

III. When there is nasal implication the nose should be thoroughly syringed out with warm or tepid salt water, once, twice, or three times a day. It should be done with the patient's head inclined forward after the method which he has elsewhere described. It is very important that the physician know how to do this well, and he should generally do it himself. Dr. Billington has always used a two-ounce hard rubber ear-syringe. It is absolutely essential that this have a suitable nozzle, which is not always the case.

IV. Do not, he says, as a rule, apply any brush to the throat; but a drachm of the first mixture syringed directly against the affected surface is efficacious.

V. Do not give quinine or other unpleasant medicine to children.

VI. Do not give alcoholic stimulants; success will be greater without them.

VII. Nourish the patient with an abundance of cold milk given frequently, to which a little lime-water may often advantageously be added. This rule is of the greatest importance. Even a bad case may be regarded favourably while the patient continues to take nourishment well. When the stage of extreme exhaustion has been reached in bad cases, juice squeezed from beefsteak is a valuable addition to the bill of fare.

Simple as this method of treatment seems, its successful application in bad or protracted cases will require much skill, tact, energy, and perseverance.

Out of 124 patients treated in the above manner ninety-four recovered and thirty died. (*New York Med. Record*, January 12, 1878.)

Treatment of Pneumonia.—In a paper read before the St. Louis Medical Society by Dr. S. T. Newman, after commenting on the blood-letting and lowering plan formerly adopted, and the stimulant and sustentative plan introduced by Todd, which he considers was far too indiscriminately adopted, remarked that the remedies which are thought to be most useful in the treatment of pneumonia are calomel, aconite, digitalis, veratrum viride, opium, antimony, quinine, gelseminum, ammonia, alcohol, and expectorants. In entering upon the treatment of pneumonia a mercurial purge may, as Watson advises, be once given. If the pulse is frequent and strong, and temperature high, digitalis should be given with aconite or veratrum viride, remembering that digitalis lessens the frequency of the pulse, while it increases its power. Aconite lessens both power and frequency. Both lower temperature. Veratrum viride lessens frequency and power, and may induce collapse. Its effect is obtained more quickly than that of digitalis. Hence when the inflammation runs high, and we desire to make an immediate impression without bleeding, the veratrum viride will meet the purpose, whilst under ordinary circumstances aconite and digitalis are safer, and therefore preferable. The remedies must be given until the desired effects are produced, and may be continued for days. Both digitalis and aconite aid the eliminating powers of skin and kidneys. Opium is also a very important remedy in pneumonia. Flint says he has known it frequently lessen

frequency of respiration and pulse, causing ease and refreshing sleep. When pneumonia is complicated with pleurisy it should be given freely, and its action may be guarded with antimony and ipecacuanha. Cyanosis from any cause contraindicates its use. Bartholow suggests gelseminum as a valuable auxiliary in cough, dyspnœa, and fever. It reduces respiration, blunts nervous sensibility, and acts on the sympathetic nerve. Dr. Newman has derived signal benefit from it as a cough mixture, where opium cannot be taken. Given as follows :—

℞. Syrup. Hypophosphit, ℥ss.
Syrup. Ipecacuanhæ, ℥ss.
Tinct. Gelsemini, ℥ii.

Ext. Hyoscyami, ℥j.—In dose, a teaspoonful two or three times a day.

Quinine is especially important where the system begins to flag. The patient should be well nourished with milk. Beef tea is much less nutritious. In regard to the use of expectorants, ipecacuanha and antimony may be given at first, and as soon as the skin is moist and the phlegm loose and free, carbonate of ammonia, senega and squills, as Fothergill recommended; but he adds that Flint maintains these were given under the misapprehension that the lungs relieved themselves by expectoration, whilst in reality the exudation is often taken up by absorption. When quinine is given it should be given in small and frequently-repeated doses. As regards alcohol, it should be given with caution, if at all, in the early stages, but freely when vital depression occurs. (*St. Louis Med. and Surg. Journal, Feb.* 1878.)

Treatment of Diphtheria.—Dr. F. J. Shiriff, of Huntington, Q., recommends the following method of treating diphtheria, as having been successful in his hands. It is a modification of a plan proposed by Dr. Robert Bell of Glasgow. As soon as the diagnosis has been made he swabs the throat thoroughly with a mixture of one part of carbolic acid to three parts of sulphurous acid and of tincture ferri perchloridi and glycerine, of each four parts. He next applies a pocket-handkerchief wet in ice-cold water under the jaws, and supported in its place by a dry cloth tied over the top of the head. The cloth is wetted frequently and continued from day to day, till all inflammation inside and swelling outside have disappeared. If there be much heat of skin and rapidity of pulse a dose of liq. ammon. acetatis and gelseminum are given until the fever abates, which generally takes place in twenty-four or thirty-six hours. If a purgative is necessary he gives a compound of pulv. sennæ. sulphur, ginger, cream of tartar, and powdered guiacum made into an

electuary with syrup. He continues the swabbing until all the patches are gone, and at the same time gives Dr. Bell's mixture, containing Potass. chlorat. ʒiii., Acidi sulphurosi, ʒiiiss., Tinct. ferri perchlorid. ℥j., Glycerine and water, ad. ℥vi. He also uses a gargle composed of salicylic acid and borax—seven gr. of the acid and five gr. of the borax to an ounce of boiling water. He scarcely ever uses stimulants. (*Canada Med. and Surgical Journal*, Feb. 1878.)

Treatment of Diphtheria.—Dr. Rodman of Frankfort, Kentucky, advocates the treatment used by Dr. Billington for the cure of diphtheria, and has himself employed the same remedies for some years with some slight modifications. He records several cases in which his treatment of idiopathic membranous laryngitis has been successful. The first case in which he resorted to his plan of treatment was that of a girl three years old. She had no alarming symptoms until laryngeal trouble began. The attending physician had used tincture of iron and quinine, a liberal diet, and stimulants sparingly. Dr. Rodman suggested the addition of chlorate of potash to the iron mixture, hot sponges to the throat and over these oiled silk, at the same time ordering the room to be filled with lime-water vapour, which was accomplished by placing hot bricks in a tub of lime-water. In addition to these measures, as occasion required, he used alum in emetic doses which cleared the air passages of mucus and any detached pieces of false membrane which might interfere with the respiration. This treatment was carried out for three days without the slightest variation, notwithstanding the fact that the croupous symptoms were alarming, and no apparent improvement took place. On the morning of the fourth day Dr. Rodman was shown a piece of false membrane—an exact cast of the trachea to its bifurcation—which the patient had thrown off the night previous. Notwithstanding the cervical glands were enlarged and the breath fetid, there were no immediate constitutional symptoms indicative of systemic poisoning, but in a short time a decided paralysis supervened which further confirmed the diagnosis of diphtheria. For this no treatment was used, and the child fully recovered after several weeks had elapsed.

Of four cases of supposed croupous laryngitis which Dr. Rodman has seen three died and one recovered. What the result might have been in these isolated cases of membranous laryngitis which proved fatal, had the measures here advocated been employed in time, it is impossible to say. The result of treatment speaks for itself in the diphtheritic cases which he has seen, and in those cases related by others adopting a similar course.

The prescription which he generally uses for a child five years old is as follows :—

℞ Tinct. ferri chloridi.
Potass. chloratis . . . . . āā ℥ss.
Syrup. limonis.
Aq. destillatæ . . . . . āā ℥iij.
M. Sig. One teaspoonful every two hours.

℞ Quin. sulph. . . . . ℈j.
Div in chart. viij.
Sig. One with alternate doses of the mixture.

The nurse is directed to give the quinine in mucilage of slippery elm, as children take it more readily in this way than any other. (*Med. Record New York*, Jan. 26, 1878).

Treatment of Diphtheria.—Dr. Willard, of Catskill, N.Y., gives briefly the course he has generally pursued in a number of cases, more or less severe, of diphtheria. His mixture is as follows :—

℞ Tr. Ferri chloridi . . . . . ℥i. to ℥iss.
Glycerini.
Aquæ . . . . . āā ℥i.

and in the majority of very severe cases—

℞ Tr. Ferri subsulphatis . . . . . ℥i. to ℥ij.
(Mousell's solution.)
Aquæ . . . . . ℥ij.

thoroughly washing the throat with it, after which allowing the patient to swallow five drops of the ferri subsulph. diluted in a little glycerine and water, and alternating this with potash chlorate every hour. Once, in from four to six hours, Dr. Willard gives carbolic acid internally, after first cleansing the throat by gargling with the same; and he makes a special point of having the throat well rinsed with carbolic acid water previous to taking nourishment.

From four to six times during the day, and once or twice during the night in extreme cases, he orders vapour of lime to be thoroughly inhaled for ten or twenty minutes, by placing a pail with a little warm water in it near the patient, covering both with a sheet, and dropping some lime into the pail, which will begin to boil in a few seconds. To accomplish the removal of as much false membrane as possible he takes a very thin piece of whalebone, and gently peels off the false membrane, often by this means averting imminent suffocation. A pail partly filled with carbolic acid water is kept near the bed, that the

patient may spit everything into it, and not swallow any of the mucus from the throat. In this manner Dr. Willard hopes a part of the poison may be cut off from being absorbed into the system through the agency of the stomach. (*New York Med. Record,* Jan. 26, 1878.)

Cardiographic and Sphygmographic Studies.—Dr. Keyt, of Cincinnati, Ohio, gives an account of a series of investigations he has undertaken to resolve various problems in connection with the circulation in man. He first set himself to determine the average time difference between the carotid and dorsalis pedis or posterior tibial pulse; also between the carotid and radial, between the radial and dorsalis pedis, and the femoral and radial pulse. He found that in different individuals the time difference of the pulse between the same designated arterial points is subject to marked inequality; that in such comparison the asynchronism between the carotid and femoral pulse shows the greatest diversity, and that in the same individual the time difference of the pulse between the same designated arterial points as noted at different times, and even in successive pulsations, is liable to limited variations. He next endeavoured to ascertain the rate of transmission of the pulse-wave as a whole along the arterial lines; and from the tracings he obtained he satisfied himself that the rate of transmission of the pulse-wave along different portions of the arterial tree is not uniform, but considerably diverse. The rate is at its minimum in the aorta, and at its maximum in the arteries of the lower extremities, whilst it is intermediate for those of the upper extremity. Along the same arterial line the rate increases as the distance from the heart increases. In the same healthy individual, in the same arteries the rate is subject to a limited variation. In different healthy individuals in the same arteries the rate is subject to marked diversity, of which the widest is in the aorta. Both in the same and different healthy individuals the pre-sphygmic portion of the systole of the ventricle is liable to considerable variation. Lastly, he tried to determine in the arteries under observation the rule of the time relation of the three principal secondary waves to the beginning of the pulsation of which they are parts. The results of a critical examination of the plates and tracings in one case showed—1. That the first and second waves of all the pairs attained their summits as early in the distal as in the proximal arteries; in the dorsalis pedis as in the proximal arteries; in the dorsalis pedis as in the carotid pulse. The beginning of the third or aortic wave is slightly but clearly delayed in the dorsal as compared with the femoral and carotid pulse, while delay is scarcely shown in the femoral and

radial as compared with the carotid pulse, and in the femoral radial pair the correspondence is complete. In a second case it was shown that the first wave attained its summit at the same time in the posterior tibial and carotid pulse, in the femoral and carotid, in the radial and carotid, and in the femoral and radial, while the summit is shown very slightly delayed in the posterior tibial as compared both with the femoral and radial. 2. The second wave is shown slightly antecedent in the femoral and subsequent in the radial, as compared with the carotid; delayed in the radial as compared with the femoral, and in the posterior tibial as compared with the femoral, radial and carotid. 3. The beginning of the aortic wave is shown in tracing to be delayed in the distal pulse of all the pairs except the femoral radial, in which it marks corresponding time. Allowing for fallacies, and giving the above results a judicious interpretation, the premises will justify at least the following statement:

Rule 1.—The interval between the beginning of the pulse and its acme of expansion is the same in all parts of the arterial system.

Rule 2.—In certain conditions of the vessels and circulation the second wave keeps close time with the first in the onward flight, while in certain other conditions of the same the second falls notably behind the first in the progress from the heart.

Rule 3.—The aortic wave rises later in the distal than in the proximal pulses, and latest in the pulse most distant from the heart. (*New York Med. Journal*, Feb. 1878.)

Dialysed Iron as an Antidote for Arsenic.—Dr. Thomas B. Reed reports a case of poisoning by arsenic cured by the administration of dialysed iron (Wyeth's). The dose was half a teaspoonful, well diluted in water, repeated at first every ten minutes, and then every half hour, until several doses had been administered. The first dose relieved all the burning pain and other suffering. (*Phil. Med. Times*, Dec. 8, 1877.)

How to introduce the Hypodermic Needle.—Dr. S. I. Allen, of White River Junction, Vermont, writes: "Placing the palm of the left hand beneath the patient's arm or leg, with the thumb and fingers draw the skin tight over the upper aspects of the limb, by which means the integument is rendered unyielding. Then holding the instrument with the thumb and index-finger only, keeping the hand immovable, thrust the point through the skin into the subcutaneous tissue. This manœuvre, if done quickly, will inflict little, if any, pain, and the patient will be sufficiently gratified, if he have been previously subjected to the almost universal method of pinching up a fold of integument for the puncture. (*New York Med. Record*, Jan. 5, 1878.)

Double Ovariotomy; Transfusion of Milk. — Professor Gaillard-Thomas reports a case in which he performed double ovariotomy. On the fourth day the patient was in a state of collapse. Professor G. Thomas determined to try the effects of transfusion, and since he had seen successful results in three cases in which blood had been transfused, he resolved to try the effects of transfusion of milk. He selected a young and healthy cow, abstracted a sufficient quantity of milk, boiled it, and injected eight ounces and a half into the arm of the patient. An hour afterwards she had a rigor; the pulse rose from 150 – 160, and the temperature to 40° C. The temperature, however, soon fell again, and the patient fell asleep after a few hours. In twenty-one days the patient was quite well. (*Med. Chir. Rundschau,* February.)

Hydrastis Canadensis in Uterine Hæmorrhage, &c.— Dr. Gordon, of Hannibal, Mo., states that he has for the last ten years made extensive use of the tincture of hydrastis in cases of uterine hæmorrhage with such satisfactory results that he now seldom resorts to any other remedy. When the hæmorrhage is severe, he gives twenty to thirty drops of the tincture at short intervals, until the active bleeding is controlled. The remedy is then continued in doses of from two to five drops at longer intervals. When there is much prostration from loss of blood he combines the tincture of Cinchona flava with the hydrastis.

In menorrhagia two to five drops of the tincture of hydrastis every two or three hours, or oftener, usually give prompt relief. Larger doses may be used if necessary. After the flow is reduced to its normal quantity the minimum dose is continued twice a day until the next menstrual period, when, if necessary, the larger doses are resumed. In dysmenorrhœa dependent on chronic endometritis, from seven to ten drops of the tincture, with an equal quantity of a solution of bromine (gtt. i.-Oj.), three times a day, have given very satisfactory results. (*Chicago Med. Jour. and Exam.,* August, 1877.)

Therapeutic Employment of the Pancreas and the Meat-pancreas Clyster of Leube.—The pancreatic secretion is the most important of all those that are discharged into the small intestine. Its quantity is greatest during digestion. Schmidt, from his experiments on animals, estimates it for a man weighing 150 lb. at 4225 grammes (upwards of 9 lb.). Its functions consist in the conversion of starch into sugar, which is effected much more perfectly and rapidly by the pancreas than by the salivary glands; the conversion of albumen and gelatine into peptones, and the preparation of fat for

the process of absorption by the lacteals. V. Wittich has obtained by the maceration of the pancreas in glycerine the two ferments which act on starch and albumen in a separate state. Defresne has recommended pancreatine in phthisical cases where the patient is unable to digest or assimilate cod-liver oil; in cases of jaundice in which fat is badly digested; in cases of dyspepsia in which fat is found in the motions; in those cases of dyspepsia in which the patient experiences abdominal pains, vomiting, diarrhœa, and flatulence several hours after meals; and, speaking generally, in those cases of disturbances of digestion in which the fats and starches are badly assimilated, and where pepsin is found to be useless. Eugesser directs that the pancreas should be minced, pressed through a hair sieve, and administered in beef-tea, which must, however, not be at a higher temperature than 50° C. (122° F.) at the time of mixture, lest the pancreas ferment be coagulated. The best temperature is that of the mouth, and all seasoning and vegetables may be afterwards added. It is a good plan to soak the gland, finely divided, in a pint of water, to which eight or ten drops of hydrochloric acid has been added. His experiments show that the admixture of the pancreas with the food is capable of passing through the stomach without losing its activity. In all cases where it is inexpedient to administer food by the mouth, Leube's meat-pancreas clyster may be given, and excellent results have been obtained in many instances. There can be no doubt that the large intestine presents an absorbing surface, as may indeed be easily shown experimentally by injecting a little salicylic acid, which may be shown to have entered the urine. Dr. Düring, of Westenhofen, reports a case of a woman, forty-eight years of age, who suffered from an abdominal aneurism, and vomited everything she took as food, and even water, so that she had fallen into a state of complete inanition. Dr. Düring at once prescribed Leube's nutritive enemata —50 grammes of meat, or about 2 oz., were ordered, with 16 grammes or 3 drachms of pancreas, the two substances being minced together and broken down into a fine pulp, with a little warm water. One half of this was injected into the rectum in the morning, and the other half in the evening. The latter portion remained from 8 to 10 hours in the rectum, after which a fœcal evacuation occurred. The patient was supported in this way from the 4th of March to the 21st of April, when the power of gastric digestion returned, and the clysters were intermitted with the recovery of digestion; the patient's health improved, and the tumour diminished in size. Another case has recently been reported of cancer of the œsophagus, in which life was preserved for nine months. (*Der Praktische Arzt.* Feb. 1878.)

Elastic Crayon of Nitrate of Silver.—M. Pajot takes a laminaria tent two millimeters in diameter, dips it in thick mucilage, and then rolls it in finely-powdered fused nitrate of silver, and allows it to dry. He thus obtains an elastic crayon of the ordinary size, which may be introduced into the uterus without fear of breaking. He believes this means to be applicable to other cavities, and for other more powerful caustics. (*Annales de Gynécologie et Gazette Obstet.*, No. 21.)

Liquorice in Diabetes Mellitus.—Mr. Martin has experimented with liquorice in order to determine whether it can be employed in the case of diabetic patients. Having under his care a man suffering with this disorder, he made him drink daily about one quart of an infusion of liquorice root, and ordered his coffee to be sweetened with a small quantity of a stronger infusion. This lessened the bitterness of the coffee, but did not destroy its aroma or other qualities. A daily examination of the urine showed not the least increase in the amount of sugar excreted. These experiments and others by the same author show that patients of this description may use liquorice without fear of increasing their malady, for the purposes for which sugar is ordinarily employed. (*Bulletin Gen. de Thérap.* Sept. 1877; *Chicago Med. Journal and Examiner*, Feb. 1878.)

Veratrum Viride in Puerperal Convulsions.—Dr. S. S. Boyd states that two years ago he read a paper advocating this plan of treatment, which was subsequently somewhat sharply criticised by various speakers and writers as being too hazardous. Dr. Fearn, of New York, had, however, treated ten cases successfully, and his own two cases recovered; he was therefore not discouraged, and on the first opportunity made further trial of it, and he gives the details of another case. The patient was a healthy primipara, who during delivery had three convulsions at intervals of a little more than an hour. The child was at length born without instruments, except just to help the head through the superior strait. Half an hour after delivery an attack occurred which lasted five minutes. As soon as she was able to swallow, 20 drops of fluid extract of veratrum viride was given, and the dose was repeated every fifteen minutes till she had taken 120 drops. When the sixth dose was given, the pulse had fallen from 144 to 130 per minute. Ten minutes after this dose the patient vomited nearly a pint of tenacious mucus, coloured by the veratrum. Within ten minutes after the emesis began the pulse fell to 54 per minute. After she had vomited three times in quick succession, 25 drops of tincture of opium were given, and this dose was repeated every time she

vomited, which occurred at short intervals at first, but after the administration of the fourth dose of the tincture of opium she ceased to vomit, and fell into a quiet sleep. The patient was left with the pulse at 60, and with instructions that if the pulse rose above 80, eight drops of the veratrum viride should be given every hour, until the pulse fell below 80 beats. Two doses were given in the course of the two following days, and the patient made an excellent recovery. Dr. Boyd, in cases of this kind, states that the effects of veratrum are due to its depressing influence on the heart, and medulla spinalis and oblongata, believing that the eclampsia does not owe its origin to brain lesion, but is produced by reflex action originating in the uterus, from which through different nerves an impression is carried to nerve centres in the medulla spinalis and oblongata, from whence it radiates to the whole of the voluntary muscular system. (*American Practitioner*, January, 1878.

An Undescribed Effect of the Action of Chloral-Hydrate.—I. Ranke injected into the crural artery of a rabbit a ten per cent. watery solution of chloral-hydrate, and observed that after a few fibrillar contractions, the muscles of the limb passed into a condition of rigidity, resembling that which results from the injection of chloroform. But if a solution of hydrate of chloral be added to a solution of myosin, no drops with myosin sheath or investment are produced as on the addition of chloroform, but well-marked rigidity is observed. Ranke concludes from this that the chloral-hydrate precipitates the albumen as chloral molecule, and that this in all probability occasions the muscle-rigor. In conclusion he warns practitioners of the danger of the injection of chloral into the veins with the object of producing narcosis, on account of its action on the heart. (*Bayr. ärztliche Intelligenzblatt*, No. 30, 1877.)

The Treatment of Poisoning and Asphyxia,—In 1874, R. Boehm stated he had been able to recall to life animals killed by a fatal dose of alkaline salts. He now reports the results of four additional series of researches on the same subject. Aubert and Delin demonstrated that after the action of certainly fatal doses of potassium salts, both the heart and its nervous apparatus still preserve for a long period their excitability, even when the sinking of the blood-pressure to zero indicates the complete suppression of the circulation. They, like Boehm, saw that the heart showed irregular, but very lively, though ineffective efforts to maintain the circulation. If 0·1 gramme of potassium nitrate be rapidly injected into the vein of a cat, the blood-pressure sinks almost immediately to

zero, the respiration ceases. Tetanic convulsions occur, and the animal unfailingly dies. Now if, three or four minutes after the respiration has ceased, artificial respiration be commenced with compression of the thorax at the moment when the chest is most full of air, the mercury in the manometer will be observed to rise at each compression from 50 to 120 mm. A few compressions of the thorax are in some instances sufficient to set the heart going again, whilst in other instances many minutes elapse. When the heart has once begun to contract, spontaneous acts of respiration occur in some after an interval of two seconds, in others not till after fifty-four seconds. In regard to re-animation after death from chloroform, Boehm found that artificial respiration alone only proved successful in those cases where the heart at the commencement of the proceeding was not perfectly quiescent. If the heart had ceased to beat, then mechanical compression of the thorax must be added to the artificial respiration, and recovery is still possible, when the heart had stopped for from seven to nineteen minutes, and the respiration for from ten to twenty-four minutes, providing the efforts at re-animation had been commenced from one to nine minutes after the arrest of the heart's action. In cases of arrest of the heart's action from pure asphyxia, as for instance from cutting off the supply of air, or from respiring hydrogen gas, its excitability is much sooner and more completely lost. Here, artificial respiration combined with compression of the thorax must be commenced immediately after the stoppage of the heart, or at least from one to one and a-half minutes after, or recovery will not take place. When recovery has actually taken place, the animals still exhibit some remarkable and abnormal symptoms. Amongst others there is a condition of exalted reflex excitability, so that the animal appears as if under the influence of strychnine, and there is a high degree of ataxy of movement, indicated by staggering, strutting, inclination to fall on one side, together with diminished sensibility. Again, there is a condition of amaurosis lasting for two or three days, and sometimes longer, without obvious change in the eye. Also, probably, disturbance of the taste and smell, depressed temperature of the body, and finally transient mellituria. The re-animated animals, speaking broadly, resemble animals that have lost the substance of their cerebral convolutions, and just as in deep narcosis or in apparent death, the functions regain their functional activity in the reverse order to that in which they were lost. Thus, the heart first recommences to beat, then the respiration begins, and finally the brain re-acquires its normal activity, with consciousness, sensation, the will, &c. (*Centralblatt f. die Chirurgie*, No. 2, 1878.)

The Cause of Sudden Death after Severe Burns.—Ponfick has made some researches on the effects of severe burns on dogs, and has found that in all instances marked alterations are observable in the blood: the red all break up into a number of coloured particles, which disappear after a short time, and cause disturbances in the kidney, spleen and medulla of bone. The kidneys eliminate the hæmoglobin circulating in a free state in the vessels, but their parenchyma becomes inflamed. They attribute the sudden death sometimes observed after severe burns to sudden alterations of the blood. (*Berlin, Klin. Wochenschrift,* No. 46, 1877.)

Nitrite of Amyl in Tinnitus Aurium.—Dr. Swan Burnett observes that any means that offers a hope of relieving tinnitus aurium is deserving of consideration, as it is not only the most annoying symptom of aural disease, but the one that as a rule is furthest removed from the influence of remedial measures. No doubt in cases of recent catarrh of the middle ear, including the Eustachian tube, we can, in a number of instances, mitigate the severity of the symptoms by the judicious use of Politzer's bag and the catheter; but in those cases where the catarrh has become chronic, and especially if it has assumed the form known as hypertrophic, inflation of the middle ear is seldom followed by marked relief, and even puncture of the membrana tympani, which has of late years been recommended for this form of catarrh, is only occasionally successful. In those cases where the pathological changes are confined to the nervous apparatus—perceptive or conducting—there is nothing we can turn to with any assurance of benefit. A remedy adapted to this form of aural disease is a desideratum. Narcotics and electricity have been extensively employed without any very definite results having been obtained. Recently, however, Dr. Michael, of Hamburg, reports the successful results he has obtained from the use of nitrite of amyl in twenty-seven cases of his own, and in six under the care of Dr. Urbantschitsch. The results were, greater or less improvement in nineteen cases. In five cases the hearing power was considerably improved. The greater part of the cases was of that class known as otitis media hypertrophica; three only were of labyrinthine disease, of which one was improved. Still more recently Weber-Liel has reported some experiments with the agent in which two cases were benefited. Mr. Burnett details a case in which material improvement followed two or three inhalations. He attributes its beneficial influence simply to its action on the sympathetic, and through this on the vascular, system. (*New York Med. Rec.* No. 352.)

On the Antiseptic and Therapeutic Qualities of Boracic Acid.—G. Polli has reported at a recent meeting of the Academy of Sciences of Lombardy researches in which urine, beer, meat, eggs, blood, and flesh were treated with boracic acid and borax for thirty days during the summer-time, and were found still to remain fresh and unfermented; whilst in control experiments without the addition of the salt, but partly with the addition of sulphite of soda, the fluids passed into a state of complete decomposition in the course of fifteen days. The energetic disinfecting property possessed by boracic acid and borax, and the facility with which these substances can be absorbed into the economy, led Polli to recommend their application in diseases in regard to the infectious nature of which no doubt exists, or in which septic conditions readily arise. He adduces several examples in which the fever of tuberculosis was diminished. In malaria Professor Visconti saw no good results, whilst another observer found many. In chronic cystitis the muco-purulent precipitate disappeared in a few days, and bad suppurating wounds recovered quickly under its external use. The dose he recommends is seventy-five grains of boracic acid and 150 grains of borax per diem. (*Pamphlet,* 1877.)

Grindelia Robusta.—This is an herbaceous perennial plant growing on the West Coast of America, between 28° and 52° N. latitude. It is about eighteen inches in height, though occasionally running up to two or three feet. Mr. I. G. Steele, by whom it has been introduced, considers it to be a counter-poison of the Rhus toxicodendron, and Dr. Gibbons believes it to be efficacious in cases of asthma. It possesses both emollient and stimulant properties, and has been found serviceable as a dressing for blisters, and in cases of burn. It has been used as a remedy in uterine and vesical catarrh, and in inflammation, and other disorders of the urinogenital apparatus both in man and woman. The dose is a teaspoonful of fluid extract. Cataplasms are occasionally made of the whole plant. (*Annuaire de la Pharmacie Française et Etrangère,* 1878.

Notes and Queries.

Valentin's Meat-Juice. — This preparation, as its name implies, is the juice of meat expressed by a powerful hydraulic press. Unlike simple extracts of meat, it contains a large quantity of albumen in solution along with some hæmoglobin. When heated, or when mixed with hot water, the albumen is precipitated, and the hæmoglobin coagulated, so that the reddish colour of the solution is changed to a light brown, and the liquid becomes turbid. The makers, therefore, recommend that it should only be mixed with cold or moderately warm water. We find, however, that when boiled or mixed with hot water, it forms a very palatable beef-tea, and in many cases might be given in this form, although in cases of great exhaustion, where the utmost nutriment is required, the mixture with cold water might be better. The makers also recommend that admixture with acids be avoided; but it has been shown that the imperfect digestion in fevers depends on want of acid in the stomach, and not on want of pepsin. The addition of a little dilute hydrochloric acid to meat-juice and water makes a very pleasant drink, and likely to be grateful to patients. Some of the albumen of the juice may be absorbed from the stomach unchanged, but part will probably be digested, and the acid will hasten this process. Altogether we think that this juice will be of great service to the physician as affording a concentrated and easily assimilated form of nutriment.

Johnston's Fluid Beef. — This preparation differs from ordinary meat extracts in containing the fibrous portion of beef as well as its soluble constituents, the beef itself being reduced to fine powder and mixed with the extract. On the addition of hot water to this preparation it forms a palatable beef-tea. The powdered beef renders it somewhat muddy, instead of clear like ordinary beef-tea, but this disadvantage is more than compensated for by the additional nutriment afforded by the powdered beef. In prolonged illness it not unfrequently happens that invalids get tired of one form of beef-tea after another, and a knowledge of various preparations such as the meat-juice already mentioned, Brand's well-known preparations, and the present, greatly helps the practitioner in carrying out his treatment.

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*** Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Ballière, of King William Street, Charing Cross.

Department of Public Health.

ON AN OUTBREAK OF DIARRHŒA AS THE RESULT OF AN (UNINTENTIONAL) EXPERIMENT IN HOSPITAL HYGIENE.

BY WILLIAM NEWMAN, M.D., F.R.C.S. ENG.

Surgeon to the Stamford Infirmary.

I AM anxious to put on record the history of an outbreak of diarrhœa in the wards of the Stamford Infirmary, inasmuch as the causes, when close attention was given to the local conditions, seem to have been very evident; and also because the structural arrangements of the building are of such a kind as to make very easy the comparisons so desirable in any sanitary investigation.

The cases of diarrhœa were in number from thirty to forty, of varying degrees of severity. In no instance, with a single exception hereafter to be mentioned, was there any very serious disturbance of health, and the disease was free from any special complication. There was no special complaint of abdominal pain, no blood was passed, and the evacuations appeared to be made up of serous fluid mixed with loose or semi-liquid fæcal matters: it did not seem that there was, as a rule, any tendency to liver inaction or disturbance of the functions of other abdominal organs. The diarrhœa was most frequent in the early part of each day, and most marked in the instances of those patients who were confined to their beds, *e.g.* cases of fractured limbs, &c.

There was no suspicion of enteric fever poison, either in the commencement or progress of the affection. The patients were

not found to have any special disturbance of appetite. Diet exercised no apparent influence on the intestinal flux, for the discomfort was equally present with those who were having the most varied diets.

The nurse in charge of the wards did not suffer, but the house-surgeon was markedly affected throughout the whole time the disease was prevailing.

The infirmary is two stories high, and in its ground-plan is oblong in form, with a frontage of 130 feet, and a depth from before backwards of thirty-six feet. If the reader will think of this outline as divided from before backwards by imaginary lines into five equal sections, it will be sufficiently easy to understand the internal arrangements. The centre, or *middle* fifth, is occupied by the entrance hall and staircase, with operating-room over the hall on the first floor: the extensions on each side are precisely symmetrical, while on the right hand are placed the wards for men, on the left hand those devoted to women.

The *outer* fifth of the building on each side contains two wards of equal size, one above the other, each holding six beds: while the remaining fifth is taken up by the surgery and medical officers' room respectively on each side of the hall, a ward of six beds (so-called *middle* wards) being provided over these rooms on the first floor. Access to the end wards is obtained by passages running from the central hall at the back of the building parallel to its greater length.

At the extreme end of, and opening from the passages on each floor, and in each outer half of the infirmary, are placed the W.C.'s—four in number, and two therefore on each floor—provision is made for these conveniences in a small, semi-detached turret. The entrance-door therefore of each closet is not far from the corresponding door of the end ward, whether the upper or lower story be considered. The closets are of the ordinary pan pattern, have an S-shaped trap beneath, and open into a four-inch lead soil-pipe, which is continued upwards to the top of the turret, and is open to the external air: this soil pipe is carried within the walls of the turret downwards to the ground level, then perforates the outside wall and opens directly into a nine-inch sanitary pipe-drain, which in its turn conveys

all waste material into a cesspool, the common receptacle situated at some little distance from the main building.

Just beyond the house wall a syphon trap exists in the line of the sewer, and from the distal or cesspool side of this syphon a ventilating shaft, three inches in diameter, travels from the sewer up the outside of the turret, guarded only at its upper or free end by a head of perforated metal work.

The sink-pipes open in free air quite independently outside the house over well-trapped iron gratings, which give communication to the drains.

The water used in the infirmary is drawn from a local well, and is stored for drinking and general purposes in a special central cistern: no water is taken from the cisterns attached to the water-closets for the purpose of either drinking or cooking.

It should be noted that the patients on the men's side of the house *alone* suffered from diarrhœa. Not any one on the women's side was in any way troubled.

A careful inquiry was set on foot to make out the causes of this outbreak: the facts above noted were evident, and from these alone it was clear that the fault must lie on the men's side of the house, that it held relation to these wards only, and that the cause, whatever it might be, was most in action in the night and early part of the day.

Food-supply and water-supply, common in all degrees to both men and women, were evidently not concerned in this outbreak.

The question then arose, How far the drainage arrangements might be in question?—and on both sides of the building they were carefully examined.

Women's side.—The closets were examined and were found to act well: there was no complaint on the part of the patients using these closets, and it did not appear that any foul odours had been noted when the handle was drawn up.

There was no blocking and no lodgment of fæcal matters in the sanitary pipe intervening between the lower end of the soil-pipe and the syphon trap. The syphon itself was sound, well-fixed, and discharges passed properly through its channel.

But the lowest two feet of the ventilating shaft (cast-iron pipe three inches in diameter), in its perpendicular course

outside the turret, were discovered to be thoroughly filled and completely blocked up by an accumulated heap of granulated iron rust. The lead soil-pipe was throughout pervious, and in good condition.

Men's side.—There had not been any complaint on the part of the patients of any unpleasant smell, but it was soon shown by trials at different hours that there was not unfrequently reflux of sewer gas when the closet was used; sometimes, not by any means always, of offensive odour.

The syphon trap was efficient: but the length of sanitary pipe which lay between the termination of the soil-pipe and the syphon had sunk in its whole extent: the projecting flange at the house extremity of the syphon had been broken off and displaced downwards, while the lower third of the internal channel was occupied by a considerable residuum of water and fæcal matters, disturbed truly enough by every discharge through the closet, but never removed or open even to the possibility of removal by any amount of flushing from above.

The ventilating-shaft was in precisely the same blocked and useless condition as that at the opposite end of the building, and from the same accumulation of stored-up iron rust.

The soil-pipe throughout was pervious and in good condition.

Means adopted. The faulty sanitary pipe was at once replaced, the syphon trap with broken flange renewed, and at each end these portions of the sewer were made to rest on slabs firmly imbedded in the ground beneath so that no parallel settlement should again occur.

The blocked ventilating pipes were removed, and four-inch diameter strong zinc pipes were substituted in their room, the communication with the sewer remaining as before.

As soon as these repairs were completed no further offensive smell was noticed from the closets, and no fresh cases of diarrhœa occurred. Those patients who had been suffering from diarrhœa speedily recovered.

The chain of events then would seem to have been—

1. Retention of even a large quantity of decomposing fæcal matters in that portion of the sewer just outside the wall of the building.

2. Return of sewer gas into the building, and especially into the end wards on the men's side.

3. Occurrence of diarrhœa in every patient who was placed in either of the wards in question during a certain time, or who sleeping in the middle ward, made use of the ill-acting closets.

4. Immediate subsidence of diarrhœa on the due repair of the sewer, so rendering continued retention of impure material in the sewer an impossibility.

The blocking and consequent uselessness of the ventilating shafts, however undesirable in theory, did not however play any part in the causation of this outburst of local illness: for these shafts were at each end of the building, and equally ineffective in each locality, yet the one section suffered, the other at the same moment offering not a single instance of diarrhœa.

Again, too, however effective in their action on the condition of thorough permeability, these pipes could not, from the intervention of the syphon, have at any time relieved the commencement of the sewer from the presence of gases evolved from excreta therein retained.

This at least may be said, that it is manifestly undesirable to employ for ventilating shafts *iron* pipes in any form, from their tendency to internal oxidation, and so to an absolute suspension of their special purpose. Ventilating-shafts should be made of strong zinc piping, or better still, if it could be managed, of glazed earthenware pipes.

With reference to the local subsidence of one portion of the sewer, it should be remarked that there were no indications to enable those who undertook the examination to form any opinion as to the time when the sanitary pipe gave way. There had been no disturbance of the adjacent ground for many months, even years, and there was nothing externally to lead to a suspicion even of the fault beneath.

It is of course possible that the giving away of the sewer with the resulting accumulation of fæcal matters coincided absolutely with this development of intestinal mischief: but supposing this were not the case, and that the deposit had been for some time present, it may reasonably be asked whether any reason can be assigned for the sudden occurrence of diarrhœa?

This reason only, and it may not improbably be a sufficient

ground. A case of severe septicæmia was lying in the lower ward under the care of one of my colleagues, following upon compound fracture of the leg. The man was extremely ill, apparently fast sinking from general exhaustion, when suddenly severe, possibly critical, diarrhœa came on. His excreta would be consigned to the lower closet, and may have furnished specially infective material.

The nurse believes he was the first, certainly among the very first, to suffer from diarrhœa. The patient in question is now slowly recovering, but throughout the whole time he was affected more or less with daily flux.

The converse may very well be named: whether indeed this poor man did not owe his blood poisoning to the polluted ward-atmosphere in the first instance. I fear no material is available to answer the very reasonable doubt.

Be this as it may, the fact remains, and I have thought it worth putting in print, that the effluvia from one imperfectly acting, possibly tainted sewer, gave rise to many cases of marked, though simple diarrhœa; that there was nothing of specific nature about any of the patients, *i.e.* in the illness so acquired; and lastly, that when the local retardation was absolutely cured, the outbreak, *pari passu*, came to an end.

REMARKS ON THE ORIGIN OF INFECTION.[1]

BY R. THORNE THORNE, M.B. LOND., F.R.C.P. LOND.

I PURPOSE to-night bringing under your notice a few points relating to the origin of infection. The question is one which has, more or less, at all times occupied the attention of the epidemiologist, but it has, in its varied aspects, been specially forced upon him during recent years, and as some time has now elapsed since the subject was discussed by this Society, I have thought that there might be some advantage in reading a brief

[1] A Paper read before the Epidemiological Society, April 8, 1878.

paper with a view of eliciting opinions on a topic, as to which many present are, by the nature of their several experiences, specially able to speak with authority.

For obvious reasons I shall make no attempt to deal with the subject exhaustively; the mere time at my disposal would alone frustrate any such attempt. But besides this, any effort to handle the question in its numerous aspects, physiological, biological, chemical and other, would be completely beyond the range I have set for myself, which is, to regard the subject from the point of view of one who, having but little acquaintance with the laboratory, has to rely for most of his data on experience gained in what I may perhaps term the field-work of epidemiology.

In the remarks which I propose to make, I desire specially to hold in view this question: Can any case of acute specific fever arise independently of an antecedent case? And by the term acute specific fever, I mean all acute febrile diseases capable of reproducing their own kind. With a view to the elucidation of this question I will in the first instance attempt a review of the principal grounds which might lead some observers, on the one hand, to answer it in the negative, others, on the other hand, to reply affirmatively.

I. The following arguments might be brought forward by those who, at times termed contagionists, maintain that no case of infectious disease can arise independently of a prior case of the same disease.

1. There is the general inference to be drawn from the well-known fact that infectious diseases do largely owe their spread to communication, immediate or mediate, with prior cases of the same disease. With regard to many of these diseases we know what are at least the ordinary means by which their poisons are eliminated from the bodies of those affected by them, and these poisons we can trace, at times through numerous and intricate channels, until at last we find that in some way or other they are received into the systems of some hitherto healthy persons, in whom forthwith the diseases they give rise to are reproduced with all their well-known signs and symptoms. This then being admittedly the ordinary source of infection, surely, it may

be urged, there are strong *à priori* grounds for assuming it to be the invariable one; for even when direct evidence as to the transmission of the specific poison cannot be traced, there must be ample reason for assuming that in some hitherto undetected way the same process has been followed out. Indeed the alternative view is, it may be alleged, founded solely on negative evidence, and is based on nothing better than the failure of the investigator to trace out a succession of circumstances, often obscure, but which are well known to have existed in many other similar instances.

2. And this first argument is strengthened by consideration of the fact that new channels by which the poisons of these specific diseases can be conveyed from one person to another are periodically being discovered; and that consequently outbreaks, which formerly would have been brought forward as affording indubitable evidence as to spontaneous origin, on the ground that all known sources of the diseases in question could with certainty be excluded from the list of possible causes, are now known to have been due to the conveyance of the poison by means of some hitherto unknown channel. Thus since it was ascertained that enteric fever and scarlet fever could be transmitted through the agency of milk as a vehicle, numerous outbreaks of these diseases, especially of enteric fever, have been ascertained to have owed their spread to this means, and thus that which must formerly have remained unexplained on the theory of the contagionist, now tends to confirm his views. The same remark applies to the striking outbreaks of enteric fever which have owed their spread to that form of water-pollution which in intermittent water-services leads to the specific poison of the disease being drawn with other filth into the water-mains during periods of intermission, and to its being subsequently distributed to the general body of consumers. And if milk can thus act as a vehicle for specific infection, and if water can thus in this newly-discovered method transmit the poison of enteric fever, may not other articles of food act in a similar manner; and may not water be a carrier of infection by other and, as yet, unknown means? In short, is it not likely that other channels for the communication of infection may be discovered, and that in this way all doubt as

to the possibility of the spontaneous origin of the diseases under consideration may, step by step, be removed? And hence, where all known methods for the conveyance of these poisons fail to explain the existence of the diseases produced by them, is it not fair to assume that the infection has really been communicated, though by some hitherto undetected channel?

3. In cases, too, where the history of an attack of infectious fever appears to afford strong evidence in favour of its being due to spontaneous origin, it often happens that, as the result of renewed and skilled investigation, or owing to the accidental discovery of some apparently trivial circumstance, the disease is after all found to be due to infection from some prior case. Many such instances must have been noted by the members of this Society. One which came under my own notice I will record. A woman living in a village which had long been free from enteric fever, sickened with that disease, and, after having communicated it to others, she died. The previous history of her attack had, up to a certain point, been somewhat carefully inquired into, and it was regarded as an instance of enteric fever of pythogenic origin. At a date prior to this woman's illness, which fairly represented the ordinary incubation period of enteric fever, she had started on a holiday trip, and at a certain railway junction the train she was in had been shunted on to a siding so as to bring the carriage she was in into close contact with some trucks laden with highly offensive, but otherwise ordinary farmyard manure, which was exposed to the full rays of a midday sun. The effluvia arising from this fœtid refuse was such as completely to overpower the woman; indeed, she felt quite unable to continue her journey, and at the first opportunity she quitted the train and returned to her home. She was stated never to have "got over" the smell of this manure, which clung as it were to her nostrils, and after a feeling of general malaise and discomfort lasting from eight to ten days, she sickened with well-marked enteric fever. So far there seemed strong grounds for believing that the disease was really brought about by the emanations in question, and that the case afforded proof that enteric fever is not invariably a self-propagating disease. It was, however, subsequently ascertained that just prior to her intended holiday trip, and also well within

the incubation period of enteric fever, the woman had been to a neighbouring town, and inquiry there elicited the fact that she had stayed at a house where a fatal case of enteric fever had occurred, and that she had there been exposed to the very conditions which had led to the outbreak in the house she visited.

4. Another point which may be urged by the contagionist is, the fact that periods of incubation, known by all to be subject to certain variations in length, do in exceptional instances vary much more than is generally recognised, and in consequence constitute a source of error for which due allowance is not made. Dr. Budd, in his work on Typhoid Fever, refers to cases in which the incubation period of that disease could not have exceeded four, and even two days; indeed so rapidly did the disease in some instances supervene on exposure to infection, that it was at first looked upon as the result of some chemical poison. In at least one group of cases the proportion attacked out of those exposed to the infection was so large as to make it practically certain that the disease was in reality the result of the previous exposure, and Dr. Budd regards the unusually short period of incubation as affording evidence of a high degree of concentration of the poison received. I have myself met with instances in which the facts elicited appeared to afford evidence of exceptionally prolonged periods of incubation. In one instance I found that a young woman, residing in a hamlet which had certainly for several years been free from enteric fever, was attacked with well-marked symptoms of that disease. Nearly a month prior to her attack she had returned from a visit to a distant part of the country, where there are strong grounds for assuming that she came into contact with the infection; and it is certain that after her return home she had neither left the hamlet, nor had any person from elsewhere visited her house. In short there must have been, according to this view, a period of incubation all but a month in length.

In this case there was, however, a peculiarity worth noting. Just within fourteen days of her return, or in other words, just about the time when the early symptoms of enteric fever ought to have manifested themselves, this young woman suffered from a sharp attack of diarrhœa, which, after lasting a day or two, left

her apparently in perfect health, until after a further lapse of twelve days, when unmistakable symptoms of enteric fever came on. In this instance it is just possible that the attack of diarrhœa, which occurred nearly a fortnight before the ordinary symptoms of enteric fever commenced, night have been a part of the disease, and that a partial elimination of the poison was then effected. If this be so, however, we are only presented with another point of difficulty in connection with the etiology of enteric fever, which those who believe that the disease is a solely self-propagating one are entitled to claim, as affording an additional argument in favour of their view.

5. And again, there are facts which are open to the interpretation that, in certain cases where strict investigation fails to elicit any information as to the possibility of recent infection, an outbreak of some acute specific fever, instead of being due to spontaneous origin, is in reality the result of infection from some prior case of the same disease which had occurred at some distant date; the specific poison having remained dormant, and having retained its vitality for a long period of time. That some "organisms," especially those of vegetable origin, do at times retain their vitality for long periods whilst in an apparently dormant state has long admitted of no doubt. And it is now further known that the "organism" found in one of the acute specific fevers affecting the lower animals, namely splenic fever, is capable of thus retaining its vitality. It exists in at least two states, in one of which it is liable to undergo rapid development; in the other it is permanent and resistant.[1] Some of these "spores," according to Dr. William Roberts, F.R.S., retain "their infective activity for an indefinite period in spite of all kinds of maltreatment." They can "be reduced to dust, wetted and dried repeatedly, kept in putrefying liquids for weeks, and yet at the end of four years still display an undiminished virulence."[2] In fact we know no reason why the infection of the various acute specific fevers should not last, under certain circumstances, for an indefinite period, much in the same way as grains of wheat have in exceptional instances lain dormant

[1] "On the Infective Process of Disease," by J. Burdon Sanderson, M.D., F.R.S., *British Medical Journal*, February 9, 1878.

[2] *On the Doctrine of Contagium Vivum*, by William Roberts, M.D., F.R.S.

for some thousands of years, and then borne fruit. With regard to scarlet fever, there are several instances on record which tend to show that its poison will remain dormant for more than a year, and then act with unabated virulence. Instances have come under my own notice, in which the facts warranted the conclusion that the poison of diphtheria had been retained for months about premises in which cases of this disease had previously occurred. Dr. A. Carpenter, in a paper read before the British Medical Association in 1875, records a case in which the poison of small-pox had evidently been retained in a so-called dormant state for a long period. "He remembered a practitioner in Oban informing him of such a case occurring in Mull. A proprietor of that island ordered the removal of some old houses which had lain in a state of ruin and uninhabited for many years. Eight men were employed in digging the walls, and every one was attacked with small-pox; the germs of that disease," to use the writer's own words, "having lain in these houses all those years."

Similar evidence with regard to enteric fever has often been recorded. Dr. W. Ogle, in some of his reports on the sanitary condition of the East Herts district, refers to cases in which attacks of this disease have in successive autumns occurred in isolated dwellings, where, so far as could be ascertained by the strictest investigation, no new source of infection could have come into operation. Dr. Budd writes, "I once knew a labourer's cottage which remained vacant nearly two years, in consequence of nearly every inmate of it having contracted typhoid fever. At the end of that time it was retenanted, and three weeks had scarcely elapsed before several of the new inmates were simultaneously seized with the same fever. The cottage stood alone in a secluded spot, and there was no fever in the neighbourhood at the time of the second attack." I know a detached house which stands in large grounds in a country district, and which was occupied by a groom and his family, amongst whom enteric fever prevailed in the autumn of 1872, one case being fatal. This family continued to occupy the house for nearly two years after this occurrence, but they left it some time in 1874 in consequence of the departure of the owner of the estate on which it stood. From that date the

house remained unoccupied until February, 1876, when it was tenanted by new inmates; and exactly within fourteen days of these latter taking up their abode there enteric fever broke out amongst them, and a most careful inquiry led both the medical man in attendance and myself to the conclusion that the disease was not imported. I also know an isolated parsonage in which the families of two successive vicars have been attacked with enteric fever.

One more instance, which is recorded by Dr. Gilbert Child, I would refer to, because of the evidence it contains as to the communication of enteric fever, after a lapse of considerable time, by means of fomites. On the 20th of November, 1873, a man arrived at a house in an Oxfordshire village, where his mother and his brother lived, bringing with him several boxes of some very filthy bedding, clothes, &c. On the 29th of the same month the brother was seized with a fatal attack of enteric fever, and on the following day the mother fell sick of the same disease. No source of infection being known, the man referred to was questioned as to his prior movements, and it transpired that in the previous September his wife had died of enteric fever at Toronto, and that he, on subsequently leaving America, had brought away with him her dirty bedding and clothing. The only other case of enteric fever which could be heard of anywhere within the district was that of a woman who was attacked on the 5th of December, and she, being also one of the man's relations, had taken to her home some of the dirty things to wash.

Instances such as these, it may well be alleged, strongly support the view that the poisons of the acute specific fevers do, under certain circumstances, retain their vitality for very long periods of time; or, in other words, that they "possess the wonderful property of passing into a state of persistent inactivity or latent vitality, in which they perform no function, but can at any moment be wakened up into active function, whenever they are brought under favourable circumstances."[1]

6. That the diseases under consideration are purely self-propagating may also be urged in view of the long-continued and

[1] *Lectures on the Occurrence of Organic Forms in connexion with Contagious and Infective Diseases*, by J. Burdon Sanderson, M.D., F.R.S.

complete immunity from them which certain isolated countries have enjoyed, and of the virulence which such diseases have exhibited when once introduced into them. Sir Thomas Watson, in his somewhat recent article in the *Nineteenth Century*, recalls the circumstance that the New World was free from small-pox prior to its discovery by Columbus in 1492, and in the same way this disease was unknown in Mexico, Iceland, and Greenland until its importation into them, when it spread with terrible desolation among their populations. We have the same experience with regard to the long immunity which the Faroe Islands and Fiji enjoyed from measles, which disease, on being imported, spread through them with all but unparalleled fatality; and a similar long-continued absence of these diseases has been noticed even when the conditions with which their spread is generally associated, have been rife. Thus conditions favouring excremental poisoning of air breathed, or of water drunk, are known to have existed for years without producing a single case of enteric fever; and yet when the disease has been imported the violence of its spread has shown conclusively how suitable a soil for the propagation of the poison existed ready to hand.

These, besides other arguments which will doubtless present themselves to your minds, may with justice be used by the supporters of the theory that the acute specific fevers never arise independently of a prior case, and they undoubtedly constitute a somewhat formidable array, the more so when it is remembered how almost impossible it is for any one holding opposite views to state with confidence, that as regards any special case, all such sources of error can with certainty be excluded.

II. There are however observers, and amongst them men of great distinction, who confidently hold the opposite view, and whilst freely admitting that the diseases in question are self-propagating, yet unhesitatingly assert that some of them at least do at times arise independently of antecedent cases; that they are in fact of spontaneous origin.

As a mere matter of argument, the view they hold is by no

means so easy of support as that of those who declare that these diseases are solely and exclusively self-propagating; for whereas the latter can in numberless instances bring forward positive evidence in favour of their conclusions, the former have the far more difficult task of proving a negative; and the mere enumeration of all the sources of error which must be avoided before any positive conclusion can be arrived at in the matter, shows how laborious of proof the position they have taken up becomes. Those, however, who do believe in the independent origin of these poisons have important points to urge in behalf of their views.

1. Judging from analogy, they may point out how their opinions derive support from the well-known fact that "spontaneous generation of the traumatic infections" does "take place,"[1] and that their respective contagia do arise in putrefactive wound products. As the result of somewhat recent experiments, Dr. Burdon Sanderson has found that "if the exudation of a simple peritonitis be injected fresh into the peritoneum of another animal, the disease assumes a more intense form in the second than in the first,"—and if in this way the disease be communicated to several animals, and by "artificial selection the most severe case be picked out, and the exudation from that case be used for further transmission, a still more intense inflammation will be the result, until at least a virus is obtained of which the virulence resembles that of the specific cases of malignant peritonitis in the human subject."[2] Here, it may be alleged, is a process in every way resembling the development by progressive stages of that which appears to be a specific poison, the starting-point being a simple inflammatory fluid exposed to a series of circumstances favourable to such development.

2. Then there is the fact that certain of the acute specific fevers are known to follow on a concurrence of certain well-known conditions, and this under circumstances which enable observers to assert that there is a total absence of anything tending to indicate the possibility of the diseases having been imported. The manner, for example, in which typhus attacks armies when they suffer from ill-feeding and over-crowding,

[1] *Sixth Report of the Medical Officer of the Privy Council.*

[2] *Infective Processes of Disease*, by J. Burdon Sanderson, M.D., F.R.S.

especially when those conditions are associated with the want and misery and depressing emotions following on defeat. The outbreaks of this disease during the recent war in the East remind us forcibly of the conditions under which it is said to arise amongst large masses of ill-cared-for troops in localities where it cannot be supposed that any previous cases of the disease have existed. The terrible havoc which typhus made both amongst the besiegers and defenders of Sebastopol is another case in point.

3. And further, all careful observers must admit that not unfrequently, when cases of infectious fever break out under circumstances which appear to afford every facility for ascertaining in every detail the previous history of the persons attacked, yet no amount of the most careful and exhaustive inquiry can elicit any information justifying the assertion that the disease is due to some antecedent case. If such cases were of rare, or even of somewhat unfrequent occurrence, they might perhaps, with but little hesitation, be set aside. But no one having access to the reports of medical officers of health can fail to be struck with the number of instances in which trained observers, carrying on their investigations in isolated localities free from the ordinary sources of error attaching to life in large towns, and making full allowance for all known sources of error, entirely fail to connect outbreaks of some of these diseases, especially of diphtheria and enteric fever, with any antecedent case, whether near or remote; and hence these observers feel themselves compelled to fall back upon the view that such diseases do, at times, have an independent origin.[1] My own failures to elicit any history of previous infection as regards cases of infectious inflammation of the throat—of diphtheria—which have occurred in isolated houses lying in districts far removed from other human habitations, have forcibly struck me, the more so as in the majority of instances those first attacked have been children of such tender years that all their movements could be ascertained with remarkable accuracy.

4. And again with regard to instances like those which have already been referred to in the argument on the other side of the

[1] The Reports by Dr. Charles Kelly, *On the Condition of the combined Sanitary District of West Sussex*, contain many instructive instances of this.

question—instances in which a disease such as enteric fever recurs in successive years, or after a lapse of years, in houses where it has previously existed—instances which are assumed to afford evidence of the poison being retained as it were in a dormant condition; it may be alleged that the conditions favourable to the development of the poisons being present, each separate outbreak is but the result of a recurrence of the process by which a new poison is each time brought into existence.

5. And yet once more, there is an argument which cannot be lightly passed over. Those who believe that the poisons of the acute specific fevers may and do arise spontaneously have a perfect right to remind their opponents that there must have been first cases of each of the diseases under consideration, and that unless we are prepared to accept the view that the several contagia, which breed truly by a "process as regular as that by which dog breeds dog, and cat, cat," were originally the result of definite acts of creation, it must be assumed that they in some other way did arise independently of antecedent cases; and what right, they may ask, have we for asserting that a process once possible is now impossible? Dr. Budd says an argument such as this constitutes "the last refuge of the partizans of spontaneous origin;" but if it be so, it is a stronghold in itself, and one which must at least be noticed before it is passed by.

Thus far I have endeavoured, and I trust successfully, to take neither side in the argument, and were it not for the circumstance that the "Remarks" I have so far offered would have had an appearance of incompleteness if I did not in some way indicate how I was influenced by the points brought forward, I should have preferred at once to draw to a conclusion. And if I do proceed briefly to explain the effect which some consideration of the subject has had upon my mind, it is on the understanding that I deem the matter as one still *sub judice*, and that I am unprepared to offer anything which I can look upon as a final opinion in regard to it.

There do however appear to me to be some grounds for doubting whether certain of these diseases, as at present met with, are exclusively self-propagating, and for raising the question

whether they may not occasionally arise independently of antecedent cases. Such personal experience as has inclined me towards this view is mainly limited to investigations into the origin of outbreaks of diphtheria, and one point with which I have been specially struck is the following:—In isolated districts, and in houses situated at times miles away from other habitations, and in some instances lying in lonely spots among mountain ranges, where a visit to or a visit from the nearest town or village would be a circumstance too important to be forgotten, I have met with instances of what appeared to me to be nothing more than a simple inflammation of the throat, at times so trivial that it has passed all but unnoticed, and yet it has led by transmission through other persons to cases of well-marked and severe diphtheria. The first attacks have often happened in children whose former movements could apparently be traced with the strictest accuracy; they have occurred under circumstances which did not appear to admit of previous infection; and it has been difficult to interpret their occurrence except on the supposition that in some way they have arisen independently of prior cases. With regard also to the well-marked attacks of diphtheria to which they seemed to give rise, all other sources of infection could be excluded with a degree of certainty rarely to be met with. And as to those first affected, whose cases appeared to be earliest in a series which led up to attacks of well-marked diphtheria, it has more than once happened that they were children in whom so-called "sore throat" was a common affection, and whose fauces when examined exhibited a loss of tissue indicative of former throat attacks.

I have stated that instances such as these have been met with in connection with outbreaks of diphtheria, and it may therefore be inferred that the early cases were merely mild attacks of that disease, the poison of which had been received in some unascertained method; but every one of these instances occurred in persons living miles away from the apparently very limited infected localities, which in some cases were mere hamlets, and this source of error seemed to be one which could unquestionably be excluded. And during the same investigations I have noticed the fact that over an area of some miles

around the district in which genuine diphtheria was prevailing, there existed prior to as well as during the diphtheria epidemic numerous instances of sore throats which, so far as examination of the patients was concerned, in every way resembled the early cases above referred to, and yet which gave no indication of being infectious; sore throat being in fact in the surrounding district a prevailing ailment. And I have hardly been able to refrain from drawing the conclusion that conditions very similar to those under which genuine diphtheria was epidemic in a limited district obtained, and had obtained before genuine diphtheria was anywhere seen, over a wide area around the immediately infected locality, and that these conditions, leading to a somewhat general predisposition to simple and apparently non-infectious inflammatory sore throat, had further, probably under somewhat modified circumstances, tended at certain points to produce an affection capable of putting on the property of infectiveness, which thus led to the transmission of the disease in a distinctly communicable form to others.

If this be a correct interpretation of the circumstances related, it would appear to indicate the possible occurrence of what may perhaps be looked upon as the progressive development of the property of infectiveness. And if the contagia of the acute specific diseases do, as has been suggested by more than one observer, belong to the vegetable world, I know no grounds for refusing to believe that organisms capable of producing a minor and an uncommunicable disease in particular stages of their growth, may in other stages of their growth, or in the course of their subsequent development, become capable of producing a major disease communicable from person to person; the affair being essentially one of soil. This is not at all a question of the development of a living organism out of matter independently of antecedent life, but merely the production by means of a process of evolution of that which gives to an already existing organism that property by which it becomes infective, a property which it may perhaps lose directly it is deprived of the circumstances which favoured its development in much the same way as special characteristics may be artificially developed in higher plant life, and be as easily lost again.

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